

5. PHYSICAL CHARACTERISTICS

5.1 SURFACE FEATURES

A geologist performed a site walk to verify the surface features. The results of physical observations and geologic literature review are presented in this section. Surface deposits in the vicinity of the site are predominantly young alluvial fan deposits of Holocene/late Pliocene age, consisting primarily of unconsolidated gravels, sand, and silt. Surface deposits to the immediate north of the site consist of interbedded marine sandstone, conglomerate sandstone, and siltstone from the Niguel Formation of Pliocene Age. Most of the surface is covered with vegetation and loose soil, but bedrock crops out near the summit on the south side of a hill adjacent to the site. This bedrock was identified as the Niguel Formation, consisting of interbedded marine sandstone, conglomeratic sandstone and conglomerate of Pliocene age. The strata strike and dip in the vicinity of the Site are N5E and 22NW, respectively. The bedrock appears indurated and competent, although highly weathered at the surface. Fractures were not observed.

The Niguel Formation is underlain by the Monterey Formation, consisting of marine siltstone and sandstone of Miocene age. The Niguel Formation has a maximum thickness of 350 feet. Deposits to the southwest of the site, across Agua Chino Wash, consist of very old alluvial fan deposits of Mid- to Early Pleistocene age. The lithology is sandy, well indurated and well dissected by erosion.

However, a housing tract is currently located at that location and no outcrop was readily visible. A local geologic map (Figure 5-1) was created using the U.S. Geological Survey digital geologic map database of the Santa Ana 30-foot by 60 foot quadrangle as the map source for the former MCAS El Toro region showing the geologic formations, contact, fault, strike and dip information in standard notation. The topography in the immediate vicinity of AA 3 site has a relief of 400 to 600 feet above msl generally dipping to the south and southwest. The site is located at an elevation of approximately 460 feet above msl.

5.2 REFINED GEOLOGY OF THE SITE

During drilling of boreholes for the installation of monitoring wells (as part of the RSE investigation), bedrock was encountered at 32 feet bgs in MW07 and 56 feet bgs in MW10. A figure showing a measured section of the subsurface lithology and equivalent measured section of the stratigraphy of the site was provided as part of the RSE work plan (Figures 2-4 and 2-5). A figure showing the plan view of these cross sections is presented in Figure 5-2. The cross sections were revised based on the information collected as part of this RSE investigation and are presented in Figures 5-3, 5-4, and 5-5. These cross sections provide sufficient alluvium and bedrock contact information.

Subsurface stratigraphy in this area was inferred from drilling logs provided in the AA 3 technical information package (IT/OHM 2000), CPT survey and the boreholes drilled to install the groundwater and perimeter gas monitoring wells as part of this RSE investigation. Subsurface stratigraphy consists of fine-to-coarse-grained sediments overlying bedrock (sandstone, siltstone, and claystone). Unconsolidated sediments were identified as well-graded gravel, gravelly sand, well-graded and poorly graded sand, silty sand, and clayey sand. Sediments were generally brown, yellowish brown, olive-brown, and greyish brown, with local iron staining.

The depth to bedrock for the entire site can be inferred from extrapolated cross sections (Figures 5-3, 5-4, and 5-5) of this report. The drilling logs for the ten monitoring wells identify the bedrock as Pliocene Niguel Formation. Sandstone is generally light to dark gray and light olive-brown with yellowish mottling, with very fine- to medium-grained sand, poorly indurated, and dense to very

dense. Siltstone bedrock is generally light brown, olive, or gray with local yellowish mottling. Claystone bedrock is generally brown to olive to very dark gray.

As shown in Figures 5-3 through 5-5, two topographic low areas were apparently present in the southwestern and northeastern portions of the site, prior to debris placement. A southwestern topographic low area was located along cross section AA 3-2-2', between cross sections AA 3-12-12' and AA 3-13-13'. A northeastern topographic low area was located along cross section AA 3-14-14', between cross-sections AA 3-9-9' and AA 3-10-10'.

5.3 REFINED HYDROGEOLOGY OF THE SITE

Four groundwater gauging events (11 November 2002, 10 December 2002, 30 January 2003 and 18 March 2003) were conducted after the installation the proposed wells (MW05 through MW10). All AA 3 wells (MW01 through MW10) were gauged prior to groundwater sampling. Table 5-1 presents the historical depth to groundwater information (eight gauging events) at the site from all wells.

The December 2002 depth to water readings in these wells ranged from 27.16 feet below the top of casing (TOC) in well MW01 to 64.97 feet below the TOC in well MW03. Groundwater elevations were calculated based on well casing elevations and ranged from 421.27 feet above msl in well MW02 to 447.58 feet above msl in well MW06 (December 2002 gauging event). Figure 5-6 shows the groundwater elevation contours from December 2002 gauging event and its corresponding flow direction. The groundwater gradient direction interpreted from these data is estimated to be southwesterly at 2.2 percent. The groundwater gradients (direction and magnitude) from the November and December 2002 monitoring events are generally consistent with the gradient estimated from data collected during previous monitoring events. The gradient magnitude varies from 1.2 percent east of well MW01 to 8.0 percent west of well MW01.

Groundwater levels decreased in nine of the ten wells (MW01, MW03, MW04, MW05, MW06, MW07, MW08, MW9, and MW10) between 0.09 feet and 0.23 feet (December 2002 gauging event). Well MW02 was not gauged during the 11 November 2002 sampling event because of the presence of a dead animal carcass in the well. Groundwater levels decreased in three of the four wells (MW01, MW02, MW03, and MW04) between 1.13 feet and 5.55 feet over the period from 9 August 2001 and 10 December 2002.

In order to verify if more than one water-bearing unit was present at AA 3, well MW09 was to be installed as a dual nested well (with one screen in alluvium [MW09A] and the other screen in the bedrock [MW09B]), and well MW10 was screened in bedrock. However, at the location of the MW09 well, bedrock was not encountered, therefore, both the dual nested wells MW09A and MW09B were installed in alluvium. Since the recent groundwater gauging events indicate that the bedrock and alluvial aquifers encountered appear to be fully hydraulically connected and can be considered a single water-bearing unit, all wells (MW01 through MW10) were used to infer the groundwater flow and gradient information in Figure 5-6.

5.4 GEOTECHNICAL EVALUATION

For details of near-surface and subsurface geotechnical soil sample collection and analysis, refer to Section 4.7.3. Logs of CPT soundings are included in Appendix C. Logs of groundwater monitoring wells and perimeter gas wells are included in Appendix B (Appendixes B1 and B2, respectively). Geotechnical laboratory test reports are included in Appendix H.




- Explanation:**
- Quaternary**
- Qyfa** } Young alluvial fan deposits (Holocene/Late Pleistocene). Gravel, sand, silt, unconsolidated
 - Qyfsa** }
 - Qvofa** } Very old alluvial fan deposits (Middle to Late Pleistocene). Sandy alluvium, reddish brown, well indurated, fan surfaces well-dissected.
- Tertiary**
- Tn** Niguel Formation (Pliocene). Interbedded marine sandstone, conglomerate sandstone, conglomerate.
 - Tco** Capistrano Formation, Oso Member (Miocene to Early Pliocene). Sandstone, medium to coarsegrained, massively bedded, friable.
 - Tps** Puente Formation, Soquel Member (Miocene). Sandstone, siltstone.
 - Tplv** Puente Formation, La Vida Member (Miocene). Sandstone, siltstone.
 - Tm** Monterey Formation (Miocene). Marine siltstone, sandstone, siliceous, diatomaceous.
 - Tt** Topanga Formation (Middle Miocene). Marine sandstone, siltstone, locally conglomerate.
 - Tvs** Vacueros and Sespe Formations, undifferentiated (late Eocene, Oligocene, early Miocene). Interbedded sandstone and conglomerate, marine and nonmarine.
- Cretaceous**
- Kw** Williams Formation (Upper Cretaceous). Feldspathic sandstone, pebbly sandstone, conglomerate sandstone, white, brown, poorly sorted, massively bedded, resistant, cliff-forming, marine

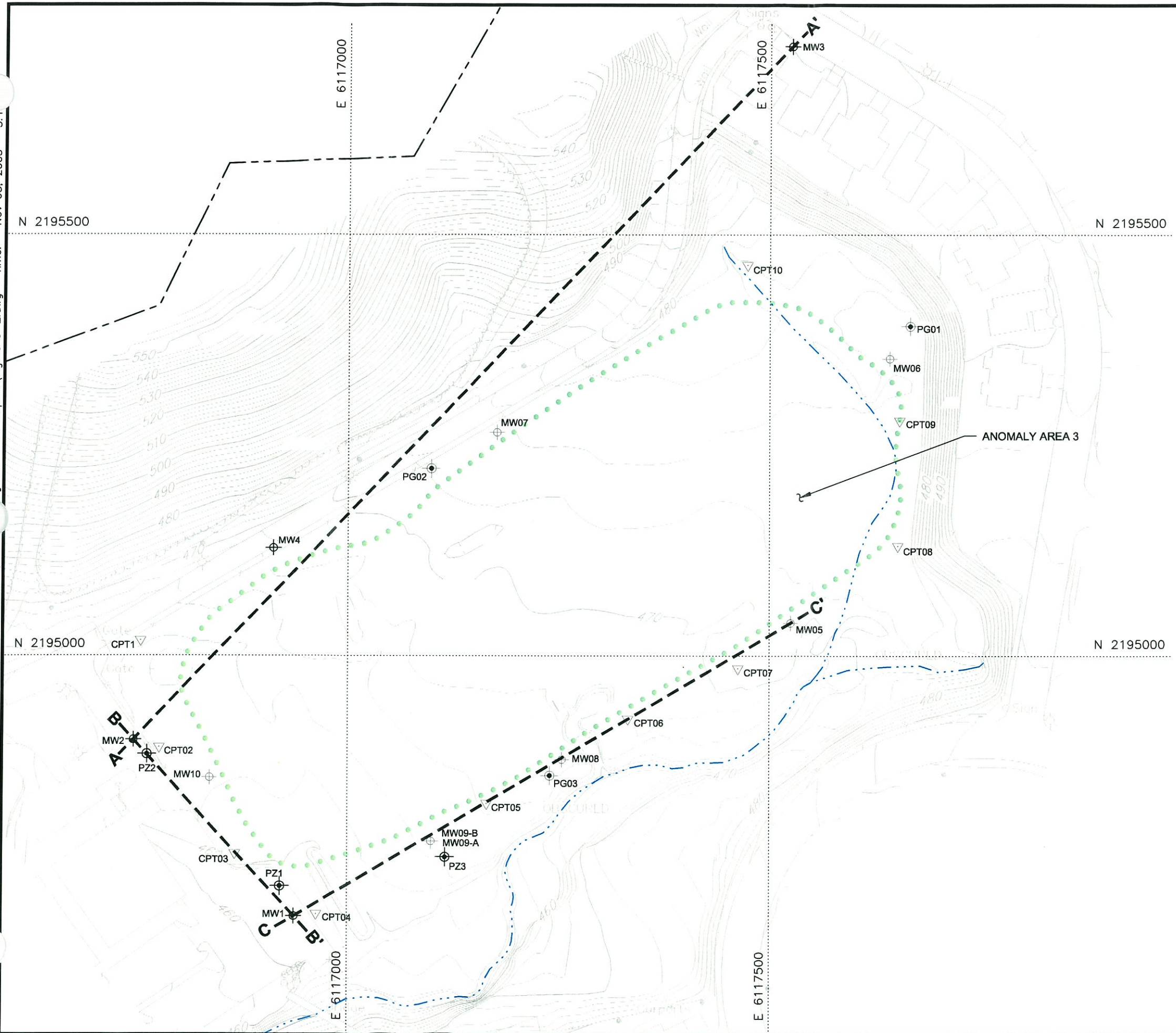
- Legend**
- Fault, dotted where covered
 - 22 Strike and dip
 - 65 Syncline

Source:
Jacobs Engineering,
Bechtel Drawing No. 073H1214
OHM Drawing No. 18609043
USGS,
Open File Report 99-172
Santa Ana 30'x60' Quadrangle
Southern California, Version 1.0
D.M. Moriove

GN 0°17' 5 MILS
MN 14° 249 MILS

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|--|--|-------|---------------|
| ESI Report | | Draft | |
| <div>Map of Geologic Information</div> <div>Removal Site Evaluation for Anomaly Area 3</div> | | | |
| Date 11-03 | MCAS El Toro | | Figure 5-1 |
| Project No. 37380 | <div>EARTHTECH</div> <div>A tyco INTERNATIONAL LTD. COMPANY</div> | | |

File: G:\us...eachCA\work\Remediation\NAVCLEAN\CTO-78\Anomaly Area 3\ESI R... Figures - ESI Report\Figure 5-2.dwg Time: Nov 05, 2003 - 3:1

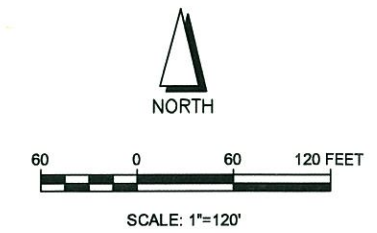


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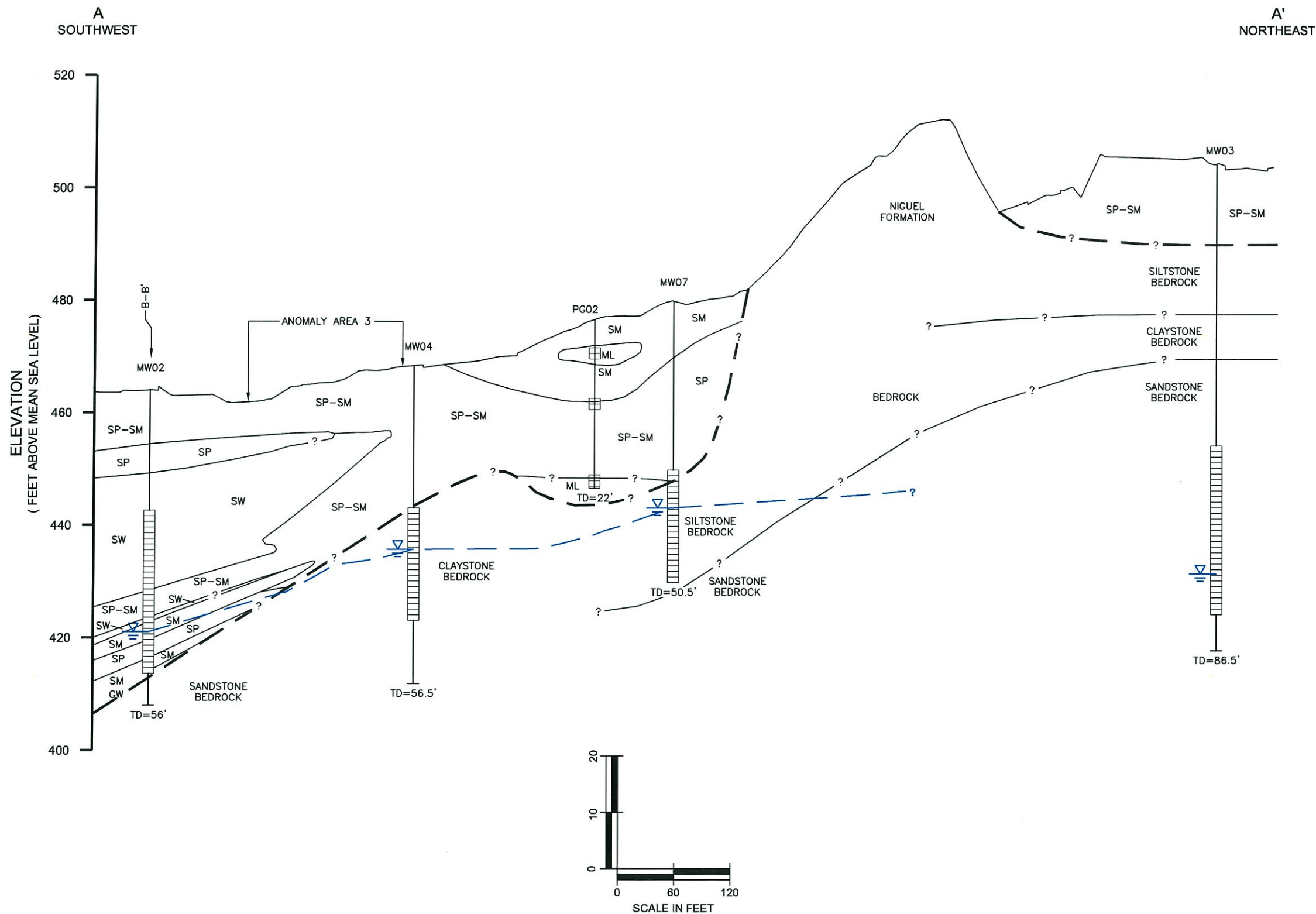
- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- CROSS-SECTION LOCATION
- RSE GROUNDWATER MONITORING WELL LOCATION
- RSE CONE PENETROMETER TEST LOCATION
- RSE PERIMETER GAS MONITORING WELL LOCATION
- EXISTING GROUNDWATER MONITORING WELL
- EXISTING VADOSE ZONE WELL


NOTES

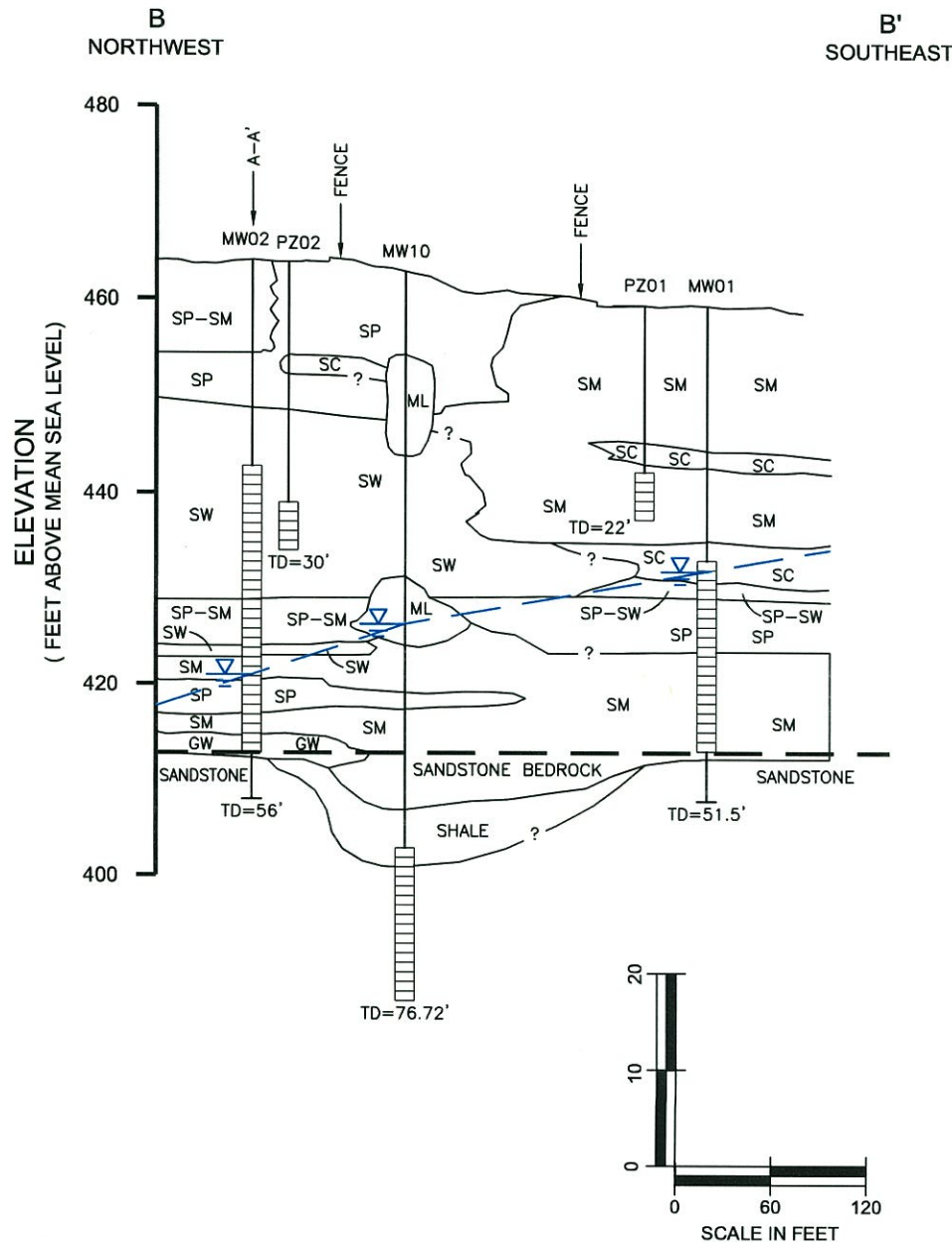
- TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
- COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, NAD 83, ZONE 6.
- ELEVATIONS ARE IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.



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| Site Plan Showing Geologic Cross-Sections A-A' Through C-C' | | | |
| Removal Site Evaluation for Anomaly Area 3 | | | |
| Date: 11-03 | MCAS El Toro | | Figure 5-2 |
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| Geologic Cross Section A-A' | | | |
| Removal Site Evaluation for Anomaly Area 3 | | | |
| Date: 11-03 | Former MCAS El Toro | | Figure 5-3 |
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| A tyco INTERNATIONAL LTD. COMPANY | | | |



LEGEND

MW4
PZ02

DESIGNATION FOR GROUNDWATER
MONITORING WELL OR PIEZOMETER



SCREENED INTERVAL OF MONITORING WELL
(RED DENOTES AN RSE WELL)

TOTAL DEPTH OF WELL BORING IN
FEET BELOW GROUND SURFACE

STRATIGRAPHIC CONTACT



TOP OF GROUNDWATER (MEASURED DECEMBER 2002)

INFERRED GROUNDWATER SURFACE (DECEMBER 2002)

TOP OF BEDROCK

GW

WELL-GRADED GRAVEL

SW

WELL-GRADED SAND

SP-SW

POORLY TO WELL-GRADED SAND

SP

POORLY GRADED SAND

SP-SM

POORLY GRADED SAND WITH SILT

SM

SILTY SAND

SC

CLAYEY SAND

NOTES

1. LITHOLOGIC CONTACTS ARE BASED ON REVIEW OF BOREHOLE LOGS.
2. GROUND SURFACE ELEVATIONS ARE BASED UPON AN AERIAL SURVEY PERFORMED BY SAN-LO AERIAL SURVEYS DECEMBER 2001.
3. ELEVATIONS ARE IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.

ESI Report

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Geologic Cross Section B-B'

Removal Site Evaluation for Anomaly Area 3

Date 11-03

Former MCAS El Toro

Project No.

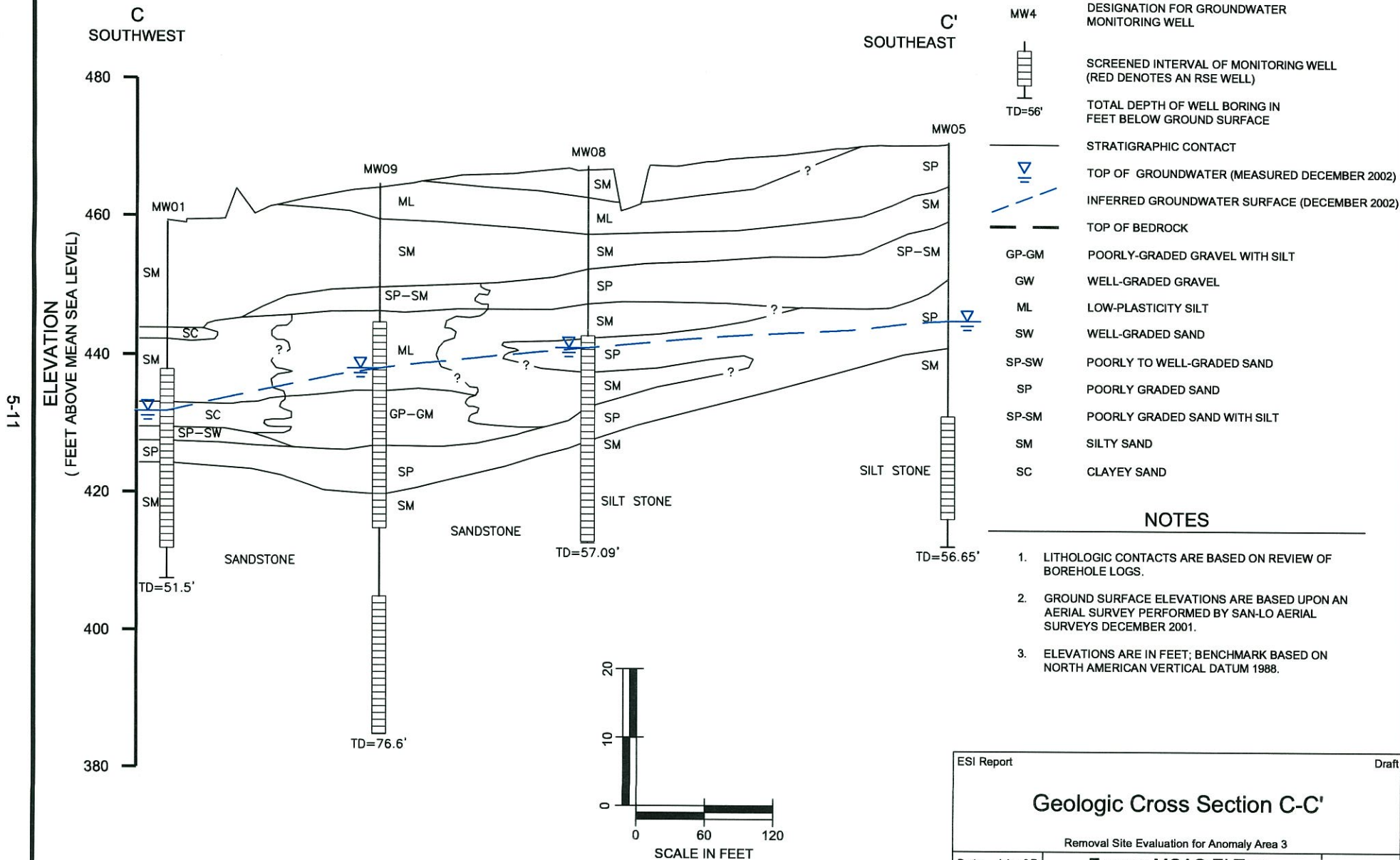
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Figure

5-4




| | | | |
|--|--|-------|-------------------|
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| Geologic Cross Section C-C' | | | |
| Removal Site Evaluation for Anomaly Area 3 | | | |
| Date 11-03 | Former MCAS El Toro | | Figure 5-5 |
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Table 5-1: Historical Depth-to-Groundwater Measurements

| Well ID | MW01 | MW02 | MW03 | MW04 | MW05 | MW06 | MW07 | MW08 | MW09A | MW09B | MW10 |
|-------------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Screen Interval (feet bgs) | 16.5–46.5 | 21–51 | 50–80 | 25–45 | 40–55 | 20–40 | 30–50 | 25–55 | 20–50 | 60–75 | 60–75 |
| Measurement Date | Feet below TOC | | | | | | | | | | |
| November 1999 | 23.50 | 39.15 | 60.15 | 28.91 | — | — | — | — | — | — | — |
| December 1999 | 24.05 | 39.64 | 61.02 | 29.57 | — | — | — | — | — | — | — |
| February 2001 | 24.98 | 40.80 | 62.49 | — | — | — | — | — | — | — | — |
| August 2001 | 21.67 | 41.34 | 63.14 | 31.27 | — | — | — | — | — | — | — |
| November 2002 | 27.16 | NM | 64.74 | 32.59 | 27.52 | 27.93 | 34.12 | 28.27 | 28.17 | 28.37 | 37.45 |
| December 2002 | 27.22 | 42.47 | 64.97 | 32.70 | 27.68 | 28.14 | 34.26 | 28.43 | 28.38 | 28.43 | 37.48 |
| January 2003 | 27.45 | 42.65 | 65.28 | 32.94 | 28.04 | 28.61 | 34.59 | 28.73 | 28.56 | 28.69 | 37.67 |
| March 2003 | 26.54 | 42.42 | 65.43 | 32.73 | 26.74 | 27.76 | 34.44 | 27.98 | 27.77 | 27.93 | 37.25 |

Notes:

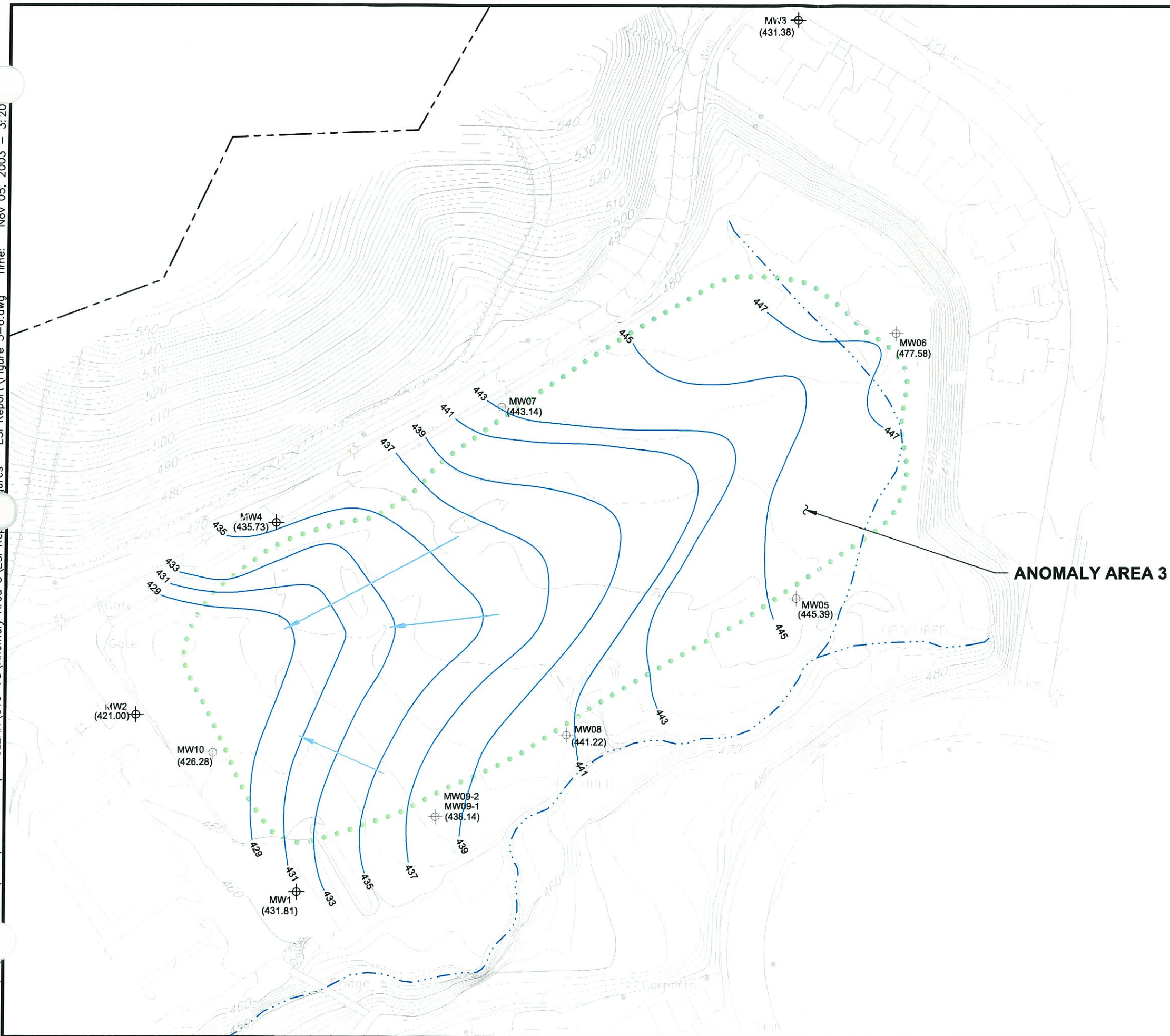
All measurements are in feet below TOC.

Wells MW05 through MW10 are newly installed during November 2002.

NM Depth to groundwater measurements not collected due to obstruction (dead animal) in the well.

— not measured

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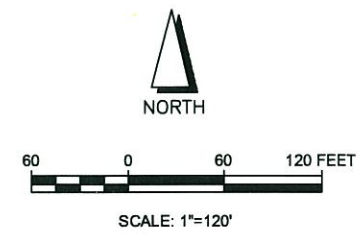



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- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- GROUNDWATER EQUIPOTENTIAL LINES USING GROUNDWATER LEVELS COLLECTED DURING DECEMBER 2002
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- RSE GROUNDWATER MONITORING WELL LOCATION
- EXISTING GROUNDWATER MONITORING WELL
- GROUNDWATER GRADIENT DIRECTION - DECEMBER 2002

NOTES

- TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
- COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, NAD 83, ZONE 6.
- ELEVATIONS IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.



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|--|---|-------|-------------------|
| ESI Report | | Draft | |
| Groundwater Equipotential Map | | | |
| Removal Site Evaluation for Anomaly Area 3 | | | |
| Date: 10-03 | MCAS El Toro | | Figure 5-6 |
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5.4.1 Near-surface Soil Data

Near-surface soil data were collected primarily for landfill cover design and construction considerations, including possible use of existing soils as a foundation layer and for actual monolithic soil cover. After observing soil specimens obtained from exploratory trenches TR01 through TR12, and surficial sampling locations HA01 through HA33, soil samples were selected for subsequent testing in the laboratory. These locations are shown in Figure 3-1. A summary of the analytical results of these samples is presented in Table 5-2. Logs of exploratory trenches are included in Appendix A. Logs of boreholes are included in Appendix B3.

Table 5-2: Summary of Shallow Geotechnical Soil Sampling Results – RSE Investigation

| Sample ID | Moisture Content (%) | Dry Density (pcf) | Particle Size Distribution GR:SA:FI (%) | Percent Passing No. 200 Sieve (%) | Atterberg Limits (LL, PL, PI) | Modified Proctor Compaction | | Specific Gravity | Soil Classification/ Identification |
|-----------|----------------------|-------------------|---|-----------------------------------|-------------------------------|-----------------------------------|--------------------------|------------------|-------------------------------------|
| | | | | | | Maximum Dry Density (pcf/A, B, C) | Optimum Moisture Content | | |
| LK141 | 3.9 | 118.9 | 2:58:40 | NA | 25, 18, 7 | NA | NA | NA | SC-SM |
| LK142 | 3.3 | NA | NA | 12.5 | NA | NA | NA | NA | SM |
| LK143 | 4.5 | NA | 2:71:27 | NA | NA | 125.0/A | 9.5 | 2.65 | SM |
| LK144 | 19 | NA | NA | 43 | 48, 30, 18 | NA | NA | NA | SM |
| LK145 | 3.9 | NA | 1:70:29 | NA | NA | NA | NA | NA | SM |
| LK146 | 4.6 | NA | 0:84:16 | NA | NA | NA | NA | NA | SM |
| LK147 | 2 | NA | 8:72:20 | NA | NA | NA | NA | NA | SM |
| LK148 | 11.3 | NA | NA | NA | NA | NA | NA | NA | SM* |
| LK149 | 6.7 | NA | 6:66:28 | NA | NA | NA | NA | NA | SM |
| LK150 | 5.1 | NA | 9:65:26 | NA | NA | NA | NA | NA | SM |
| LK151 | 3.6 | 115.5 | NA | 37 | 31, 19, 12 | 118.5/A | 11.5 | 2.64 | SC-SM |
| LK152 | 3.9 | NA | 2:79:22 | NA | NA | NA | NA | NA | SM |
| LK153 | 6.8 | NA | NA | 50.7 | NA | NA | NA | NA | s(ML) |
| LK154 | 4.5 | 112.3 | NA | 49.1 | NA | NA | NA | NA | SM |
| LK155 | 1.5 | NA | 4:74:22 | NA | Nonplastic | NA | NA | NA | SM |
| LK156 | 11.2 | 128 | NA | NA | NA | NA | NA | NA | SC* |
| LK157 | 2 | NA | NA | NA | NA | NA | NA | NA | SM* |
| LK158 | 20.9 | 125 | NA | NA | NA | NA | NA | NA | CL* |
| LK159 | 2.8 | NA | NA | 31.5 | NA | NA | NA | NA | SM |
| LK160 | 3.9 | NA | 1:77:22 | NA | NA | NA | NA | NA | SM |
| LK161 | 3.2 | NA | 0:61:39 | NA | NA | NA | NA | NA | SM |
| LK162 | 7.5 | NA | NA | NA | NA | NA | NA | NA | SM* |
| LK163 | 3.1 | NA | NA | 32.6 | NA | NA | NA | NA | SM |
| LK164 | 5.3 | NA | NA | 17.4 | NA | NA | NA | NA | SM |
| LK165 | 3.8 | NA | NA | 32.7 | NA | NA | NA | NA | SM |
| LK166 | 8.8 | NA | 1:66:33 | NA | NA | NA | NA | NA | SM |

5.4.2 Subsurface Soil Data

Subsurface soil data were collected to aid in assessing:

- compressibility characteristics and potential for static and seismically induced settlement, and
- shear strength characteristics and evaluation of slope stability and lateral displacements under static and seismic loading conditions.

A summary of the analytical results of these samples is presented in Table 5-3. Data were obtained (October through December 2002) from CPT soundings CPT01 through CPT10, ground water monitoring wells MW04 through MW10, and gas wells PG1 through PG3. In addition, available data previously collected were reviewed and used in this assessment, including installation data of groundwater monitoring wells MW01 through MW04 and piezometers PZ1 through PZ3, installed by IT/OHM in 2000.

Table 5-3: Summary of Subsurface Geotechnical Soil Sampling Results – RSE Investigation

| Sample ID | Soil Classification/ Identification | Moisture Content (%) | Dry Unit Weight - Drive Cylinder (pcf) | Percent Passing No. 200 Sieve (%) | Particle Size Distribution (GR:SA:FI, %) | Atterberg Limits (LL, PL, PI) |
|-----------|--|-------------------------|--|---|--|----------------------------------|
| LK169 | SP | 5.2 | 96.3 | NA | 0:94:3 | NA |
| LK170 | SP* | 2.6 | 97.6 | NA | NA | NA |
| LK171 | SM | 6.1 | 106.5 | NA | 4:79:17 | NA |
| LK172 | SP-SM | 5.2 | 99.3 | NA | 1:88:11 | NA |
| LK173 | SP-SM & SP* | 5.1 | 98.7 | NA | NA | NA |
| LK174 | (SM)g | 8.2 | 120.7 | NA | 38:49:13 | NA |
| LK175 | SM & CL* | 29.7 | 98.2 | NA | NA | NA |
| LK176 | CL* | 23.2 | 102.6 | NA | NA | NA |
| LK177 | s(CL) | 27.5 | NA | NA | 5:36:59 | NA |
| LK178 | MH(s) | 48.3 | NA | 85 | NA | 96, 50, 46 |
| LK179 | CL* | 57.1 | NA | NA | NA | NA |
| LK180 | s(CL) | 37.1 | 83 | 67.7 | NA | NA |
| LK181 | SM | 4 | 99.5 | 29.5 | NA | NA |
| LK182 | SM* | 8.4 | 90.6 | NA | NA | NA |
| LK183 | SM* | 11.5 | 90.8 | NA | NA | NA |
| LK184 | SC | 16.8 | 102.2 | 44.6 | NA | 41, 22, 19 |
| LK185 | s(ML) | 24.1 | 95.4 | NA | 2:39:59 | NA |
| LK186 | SC & CL* | 21.1 | 97.4 | NA | NA | NA |
| LK187 | (SW-SM)g | 9.6 | 128.9 | NA | 41:49:10 | NA |
| LK188 | CL | 78.5 | 53 | 85.5 | NA | NA |
| LK189 | MH | 73.3 | NA | 90.6 | NA | 84, 46, 38 |
| LK190 | SP-SM* | 2.6 | 100.3 | NA | NA | NA |
| LK191 | SW-SM | 2.6 | 103.7 | NA | 0:88:12 | NA |
| LK192 | SP* | 2.7 | 96.5 | NA | NA | NA |
| LK193 | SP_SM | 2.3 | 100.7 | NA | 1:93:6 | NA |
| LK194 | (SW-SM)g | 4.2 | 112.6 | NA | 22:66:12 | NA |

Table 5-3: Summary of Subsurface Geotechnical Soil Sampling Results – RSE Investigation

| Sample ID | Soil Classification/ Identification | Moisture Content (%) | Dry Unit Weight - Drive Cylinder (pcf) | Percent Passing No. 200 Sieve (%) | Particle Size Distribution (GR:SA:FI, %) | Atterberg Limits (LL, PL, PI) |
|-----------|--|-------------------------|--|---|--|----------------------------------|
| LK195 | SM | 11.8 | 110.6 | 22.4 | NA | NA |
| LK196 | ML | 27.9 | 92.4 | NA | NA | 36, 26, 10 |
| LK197 | SM | 19.6 | NA | 34.4 | NA | NA |
| LK198 | ML* | 29.2 | 91.4 | NA | NA | NA |
| LK199 | SM | 24 | 100.1 | NA | 0:86:14 | NA |
| LK200 | SP* | 1.9 | 93.1 | NA | NA | NA |
| LK201 | s(CL) | 13.2 | 10.6 | 55.1 | NA | NA |
| LK202 | (ML)s | 21.3 | 89.7 | NA | 2:15:83 | NA |
| LK203 | SM | 8.3 | 104.3 | NA | 1:75:24 | NA |
| LK204 | SM* | 9.5 | 109.6 | NA | NA | NA |
| LK205 | SC | 14.4 | 102.2 | NA | 5:79:16 | NA |
| LK206 | SM* | 3.9 | 99.6 | NA | NA | NA |
| LK207 | SP-SM | 4.3 | 105 | NA | 1:88:11 | NA |
| LK208 | SM* | 7.7 | 108.4 | NA | NA | NA |
| LK209 | SM | 11.8 | 96 | NA | 2:75:23 | NA |
| LK210 | SM | 11.9 | 96.6 | 35.4 | NA | NA |
| LK211 | SC* | 12.1 | 108.3 | NA | NA | NA |
| LK212 | (GW-GM)s | 7.3 | 126.7 | NA | 55:37:8 | NA |
| LK213 | (SP)g* | 13 | NA | NA | NA | NA |
| LK214 | SP | 16.7 | NA | NA | 1:97:2 | NA |
| LK215 | SP* | 17 | NA | NA | NA | NA |
| LK216 | SP-SM | 21.5 | NA | NA | 1:93:6 | NA |
| LK217 | SP* | 12.1 | NA | NA | NA | NA |
| LK218 | SP* | 20 | NA | NA | NA | NA |
| LK219 | SP | 17.4 | NA | NA | 1:95:4 | NA |
| LK220 | SP* | 13.9 | NA | NA | NA | NA |
| LK221 | SP* | 17.7 | NA | NA | NA | NA |
| LK222 | SP-SM | 17 | NA | NA | 0:94:6 | NA |
| LK223 | CL* | 6.8 | 95.3 | NA | NA | NA |
| LK224 | (SC)g | 5.5 | 109.3 | NA | 15:56:29 | NA |
| LK225 | CL* | 17.4 | 93.2 | NA | NA | NA |
| LK226 | SC | 15.9 | 91.8 | 41.6 | NA | 49, 21, 28 |
| LK227 | SP-SM | 2.4 | 104.9 | NA | 14:81:5 | NA |
| LK228 | SP* | 2.3 | 114.4 | NA | NA | NA |
| LK229 | SP-SM | 2.8 | 105.6 | NA | 4:91:5 | NA |
| LK230 | SC | 9.7 | 98.8 | 30.8 | NA | NA |
| LK231 | SP-SM | 15.8 | 109.5 | NA | 0:93:7 | NA |
| LK232 | SP | 8.9 | NA | NA | 1:95:4 | NA |

In addition, previous topographic and groundwater level records that were available, as well as recent geotechnical laboratory test results, were used in "reconstructing" previous site history and subsurface conditions. A site plan with interpreted ground water level contours is shown Figure 5-6.

Interpreted stratigraphic conditions were summarized in cross sections AA 3-1-1' through AA 3-14-14'. These cross sections are as shown on Figure 5-7 and are supplemented by subsurface soil exploration data, particularly CPT sounding records and borehole data. Specifically, CPT of tip resistance in tons per square foot (tsf), friction ratio (percent) and pore water pressure ratio (percent), unified soil classification, and standard penetration test (SPT) blow count were added to those cross sections and are shown on Figure 5-8, Figure 5-9, and Figure 5-10. These data aid in interpreting geologic and stratigraphic conditions under the AA 3 site perimeter, namely along the following: (1) Sections 1-1' and 10-10': southwest and northeast sides (Figure 5-8), (2) Section 12-12': northwest side (Figure 5-9), and (3) Section 14-14': southeast side (Figure 5-10).

The major subsurface soil strata identified, with the purpose of conducting geotechnical evaluations for the site, are shown in Figures 5-8, 5-9, and 5-10.

5.4.3 Interpreted Subsurface Soil Conditions

A summary of field explorations providing ("deep") subsurface soils conditions is provided in Table 5-4. Figures 5-8, 5-9, and 5-10 show approximate limits of man-made fill (debris), underlying Agua Chion wash alluvium, groundwater level, and the interpreted depth to bedrock.

It was noted during the performance of geotechnical work that a previous exploration shows the bedrock location somewhat shallower than it appears from this investigation. As shown in the above mentioned profiles, bedrock was interpreted to be approximately 390 to 410 above feet msl beneath the AA 3 site, although at the location of CPT09, which penetrated nearly 110 feet below existing ground surface, bedrock was inferred to be at or below 365 feet above msl.

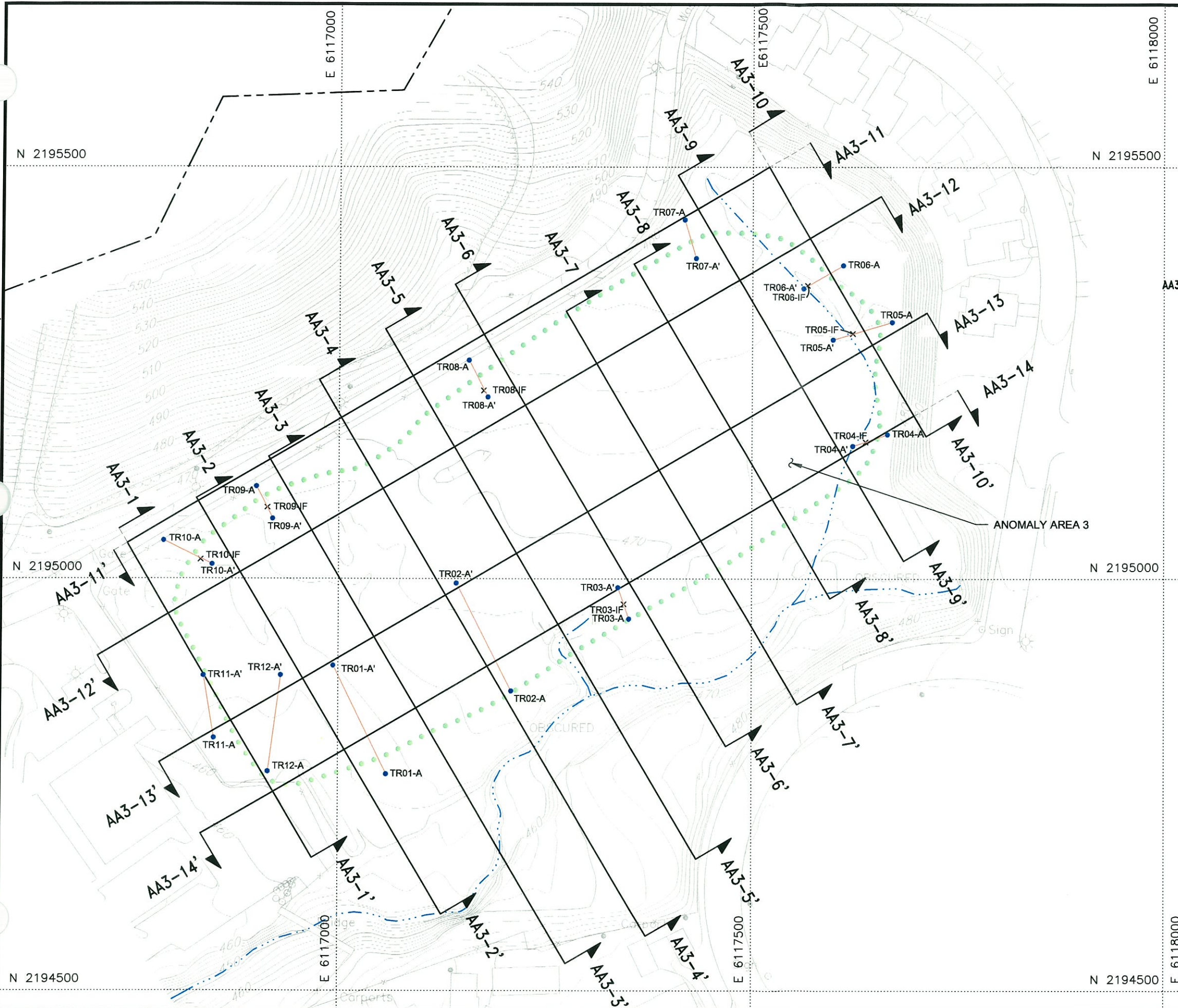
It is possible that the upper several feet of the bedrock formation (identified as the Niguel Formation in 1999 OHM reports) is severely weathered under large portions of the site, and is therefore displaying a "soil-like" behavior. In this regard, the upper portion of the bedrock would be significantly softer, more compressible, and weaker than a fresh, unweathered bedrock formation. Profiles shown in Figures 5-8, 5-9, and 5-10 attempt to roughly identify the location of relatively firmer and unweathered bedrock rather than "soil-like" bedrock.

In general, alluvial soils consist of loose to dense sands, interbedded with layers of medium stiff to very stiff fine-grained soils (silts and clays). Locally, sand layers were found to be very dense and gravelly. Similarly, a few fine-grained soil layers of a few feet in thickness were found to be relatively soft to medium stiff. Major identified subsurface soil strata from CPT soundings (Table 5-5) with the purpose of conducting geotechnical evaluations for the site.

In addition, profiles of soil property characterization data versus depth and elevation are provided in Figures 5-11 and 5-12, respectively. These profiles include measured soil penetration resistance (raw blow count, without correction in blows per foot), equivalent SPT N-value, in situ moisture content (percent), dry unit weight (pounds per cubic foot [pcf]), Atterberg Limits (liquid limit [LL] and plastic limit [PL]) and fines content (percent).

Groundwater is estimated to be approximately 40 to 60 feet bgs, and ranges in elevation from approximately 425 to 450 feet msl from northeast to southwest, as shown in Figures 5-8, 5-9, and 5-10.

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LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- MCAS EL TORO BOUNDARY
- EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- TRENCH LOCATION AND DESIGNATION
- INTERFACE OF DEBRIS AND FILL SOIL
- CROSS-SECTION LOCATION AND DESIGNATION

NOTES

- TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD FROM AERIAL PHOTOGRAPHY DATED DECEMBER 2001 BY SAN-LO AERIAL SURVEYS.
- COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, NAD 83, ZONE 6.
- ELEVATIONS IN FEET; BENCHMARK BASED ON NORTH AMERICAN VERTICAL DATUM 1988.
- TRENCHES THAT DO NOT SHOW THE INTERFACE OF DEBRIS AND FILL SOIL ARE TRENCHES WHERE WASTE WERE NOT IDENTIFIED UNTIL END A'.

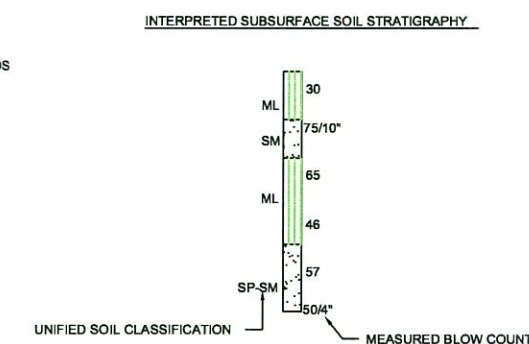
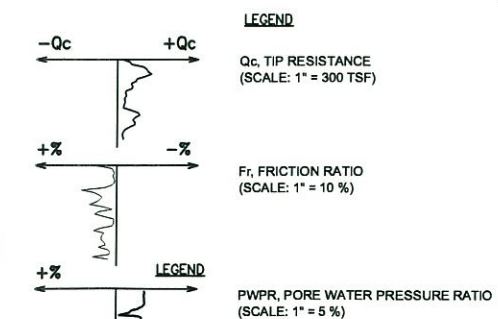
ESI Report

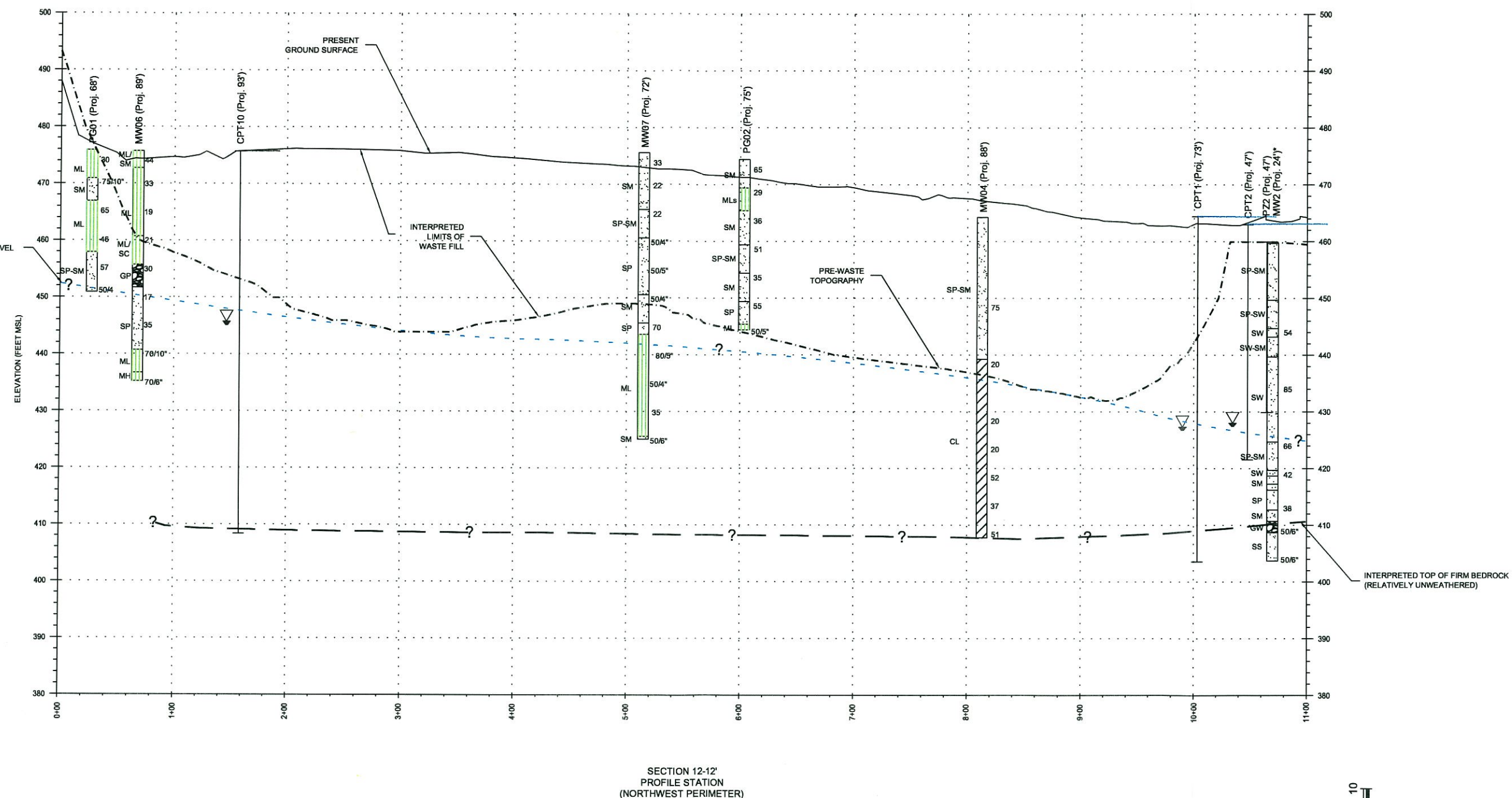
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Site Plan Showing Cross Sections AA3--1-1' through AA3--14-14'

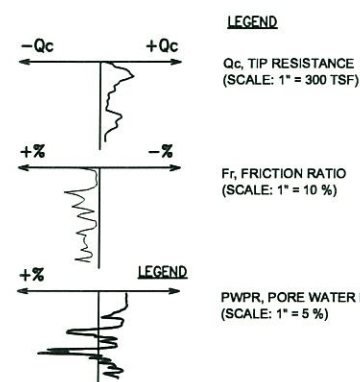
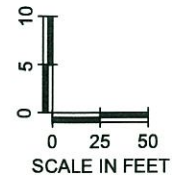
Removal Site Evaluation for Anomaly Area 3

| | | |
|----------------------|---|--------|
| Date: 11-03 | MCAS El Toro | Figure |
| Project No. 37380 | EARTH TECH A tyco INTERNATIONAL LTD. COMPANY | 5-7 |





SECTION 12-12'
PROFILE STATION
(NORTHWEST PERIMETER)

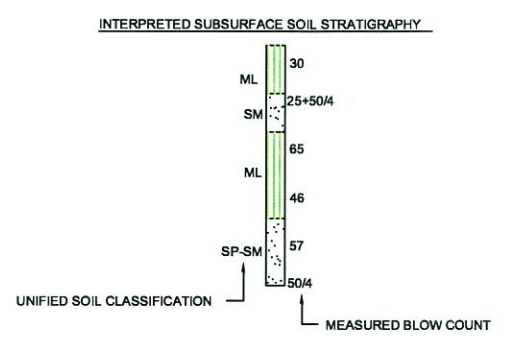



--- INTERPRETED GROUNDWATER LEVEL
FROM GROUNDWATER MONITORING WELLS

▽ DEPTH TO GROUNDWATER
INTERPRETED FROM CONE
PENETROMETER TESTING

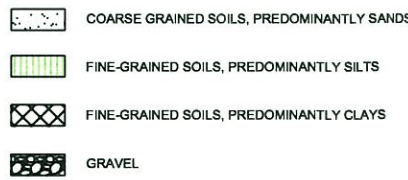
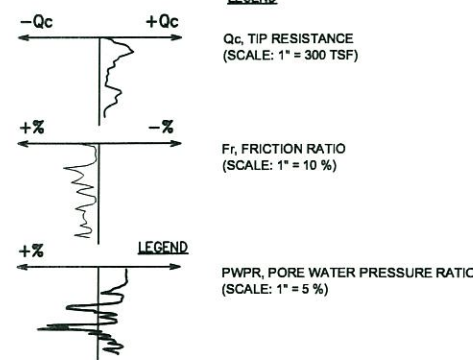
* SHIFTED FOR CLARITY PURPOSE

- COARSE GRAINED SOILS, PREDOMINANTLY SANDS
- FINE-GRAINED SOILS, PREDOMINANTLY SILTS
- FINE-GRAINED SOILS, PREDOMINANTLY CLAYS
- GRAVEL
- SANDSTONE

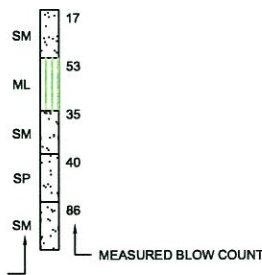


| | | | |
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| ESI Report | | Draft | |
| Section AA3-12-12' | | | |
| Interpreted Subsurface Soil Conditions | | | |
| Removal Site Evaluation for Anomaly Area 3 | | | |
| Date: 11-03 | Former MCAS EI Toro | | Figure 5-9 |
| Project No. 37380 | E A R T H  T E C H | | |
| A <i>tyco</i> INTERNATIONAL LTD. COMPANY | | | |

NOTE: THIS DRAWING WHEN REDUCED TO 11"x17" SIZE IS 50% SMALLER THAN FULL SIZE VERSION



INTERPRETED SUBSURFACE SOIL STRATIGRAPHY



| | | | |
|--|---|-------|-------------|
| ESI Report | | Draft | |
| Section AA3-14-14' Interpreted Subsurface Soil Conditions Removal Site Evaluation for Anomaly Area 3 | | | |
| Date: 11-03 | Former MCAS El Toro | | Figure 5-10 |
| Project No. 37380 | EARTH TECH A tyco INTERNATIONAL LTD. COMPANY | | |

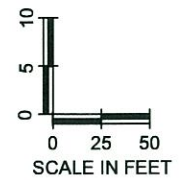
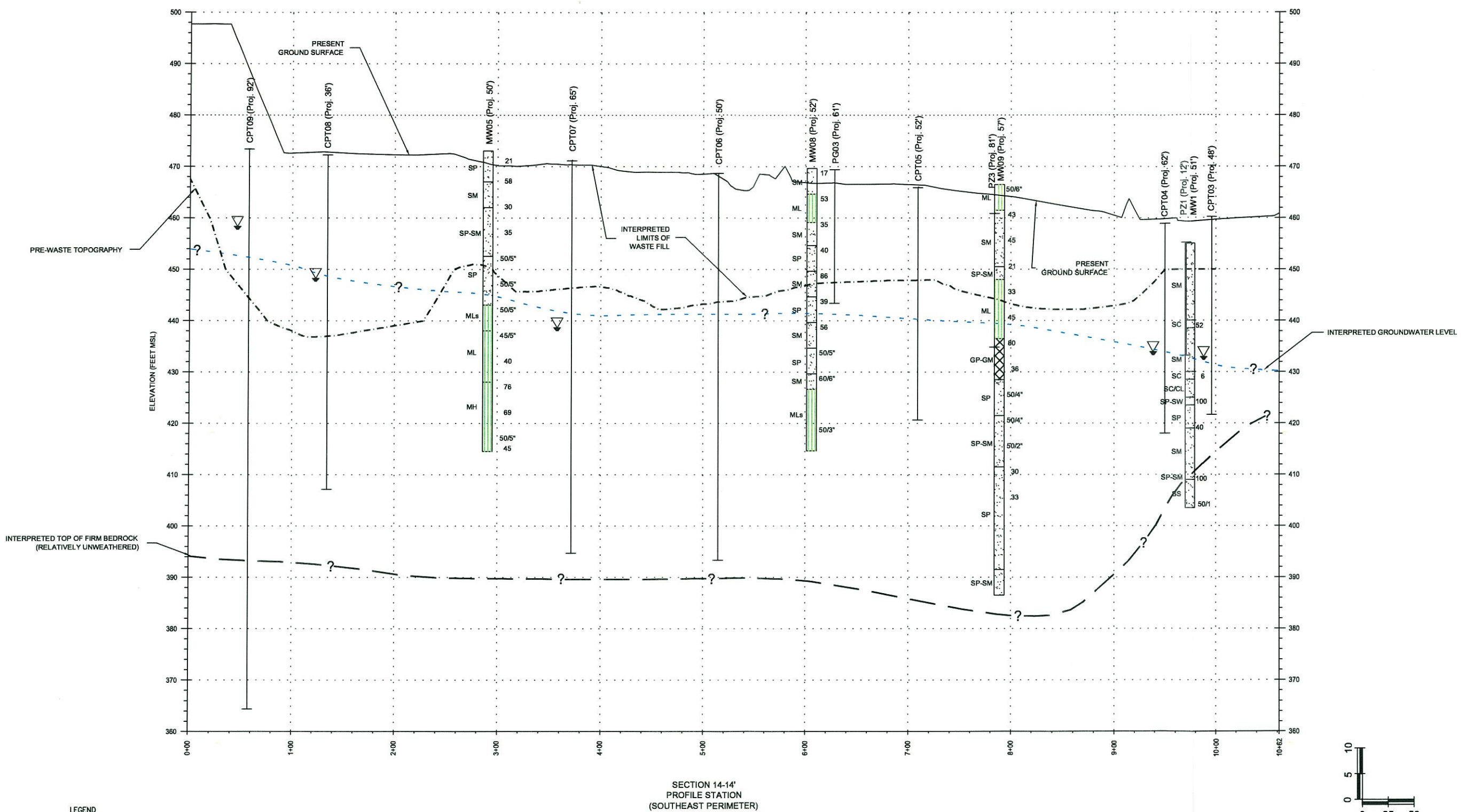


Table 5-4: Summary of Subsurface Soil Exploration Details – RSE Investigation

| Date of Exploration (m/d/yr) | Exploration Number | Exploration Type | Ground Surface Elevation ^[1] (feet above msl) | Total Depth (feet) | Groundwater Depth ^[1, 2] (feet bgs) | Bedrock Depth ^[1, 3] (feet) | Groundwater Elevation ^[1, 2] (feet above msl) | Bedrock Elevation ^[1, 3] (feet above msl) | Reference |
|------------------------------|--------------------|------------------|--|--------------------|--|--|--|--|------------------|
| 12/21/95 | MW-01 | GW MW | 455 | 51.5 | 24 | 46 | 431 | 409 | IT/OHM 2000 |
| 05/27/98 | MW-02 | GW MW | 460 | 56.0 | 36 | 49 | 424 | 411 | IT/OHM 2000 |
| 06/01/98 | MW-03 | GW MW | 500* | 86.5 | 60 | 35 | 441 | 465 | IT/OHM 2000 |
| 06/01/98 | MW-04 | GW MW | 464 | 56.5 | 29 | 25 | 435 | 439 | IT/OHM 2000 |
| 06/01/98 | MW-05 | GW MW | 473 | 58.5 | 30 | NE | 443 | NE | Earth Tech 2002a |
| 6/4-5/98 | MW-06 | GW MW | 476 | 40.5 | 26 | NE | 450 | NE | Earth Tech 2002a |
| 12/05/01 | MW-07 | GW MW | 476 | 50.5 | 36 | 32 | 440 | 444 | Earth Tech 2002a |
| 12/20/01 | MW-08 | GW MW | 470 | 55.0 | 26 | NE | 443 | NE | Earth Tech 2002a |
| 12/05/01 | MW-09 | GW MW | 467 | 80.0 | 27 | NE | 440 | NE | Earth Tech 2002a |
| 12/06/01 | MW-10 | GW MW | 464 | 76.0 | 38 | 56 | 426 | 408 | Earth Tech 2002a |
| 05/27/98 | PG-01 | PG Well | 476 | 25.0 | NE | NE | NE | <451 | Earth Tech 2002a |
| 12/03/01 | PG-02 | PG Well | 474 | 30.0 | NE | NE | NE | <444 | Earth Tech 2002a |
| 12/03/01 | PG-03 | PG Well | 469 | 26.0 | NE | NE | NE | <443 | Earth Tech 2002a |
| 12/04/01 | CPT-1 | CPT | 464 | 61.0 | 37 | ~ 56 (?) | 427 | ~ 408 (?) | Earth Tech 2002a |
| 12/04/01 | CPT-2 | CPT | 463 | 42.0 | 35 | NE | 428 | <421 | Earth Tech 2002a |
| 12/20/01 | CPT-3 | CPT | 460 | 38.0 | 27 | NE | 433 | <422 | Earth Tech 2002a |
| 12/20/01 | CPT-4 | CPT | 459 | 41.0 | 25 | NE | 434 | <418 | Earth Tech 2002a |
| 12/20/01 | CPT-5 | CPT | 466 | 45.5 | NM | NE | NM | <420 | Earth Tech 2002a |
| 12/20/01 | CPT-6 | CPT | 469 | 75.0 | > 18 | NE | < 451 | <394 | Earth Tech 2002a |
| 12/04/01 | CPT-7A | CPT | 471 | 77.0 | 33 | NE | 439 | <394 | Earth Tech 2002a |
| 12/06/01 | CPT-8A | CPT | 472 | 65.0 | 24 | NE | 448 | <407 | Earth Tech 2002a |
| 12/06/01 | CPT-9 | CPT | 473 | 109.5 | 15 | NE | 458 | <363 | Earth Tech 2002a |
| 12/06/01 | CPT-10 | CPT | 476 | 68.0 | 30 | NE | 446 | <408 | Earth Tech 2002a |
| 10/1999 | PZ-01 | PG Well | 455 | 22.0 | NR | NE | NR | NE | IT/OHM 2000 |

Table 5-4: Summary of Subsurface Soil Exploration Details – RSE Investigation

| Date of Exploration (m/d/yr) | Exploration Number | Exploration Type | Ground Surface Elevation ^[1] (feet above msl) | Total Depth (feet) | Groundwater Depth ^[1, 2] (feet bgs) | Bedrock ^[1, 3] Depth (feet) | Groundwater Elevation ^[1, 2] (feet above msl) | Bedrock Elevation ^[1, 3] (feet above msl) | Reference |
|------------------------------|--------------------|------------------|--|--------------------|--|--|--|--|-------------|
| Oct, 1999 | PZ-02 | PG Well | 460 | 30.0 | NR | NE | NR | NE | IT/OHM 2000 |
| Oct, 1999 | PZ-03 | PG Well | 467 | 26.0 | NR | NE | NR | NE | IT/OHM 2000 |

NOTES:

[1] Depths and elevations were rounded off to the nearest foot.

[2] Interpreted groundwater depth and elevation based on CPT should only be considered as rough approximations (estimated based on pore water pressure dissipation tests, or dipmeter measurements).

[3] Bedrock depth based on CPT sounding records should be considered only as approximate interpretation, particularly in identifying soft weathered ("soil-like") bedrock, like those existing at AA 3 site.

NE = not encountered

NR = not reported

N/A = not applicable

msl = mean sea level

CPT = cone penetrometer test

GW MW = groundwater monitoring well

PG Well = perimeter gas well

* This elevation will be verified

Table 5-5: Summary of Interpreted Stratigraphy from CPT Soundings--RSE Investigation

| Exploration Number | Ground Surface Elevation (feet above MSL) | Depth to Top of Generalized Layer (feet) | Generalized Layer Thickness (feet) | Interpreted Stratigraphy and Soil Type |
|--------------------|---|--|------------------------------------|--|
| CPT-1 | 464 | 0 | 16 | Medium dense sands and silty sands |
| | 448 | 16 | 14 | Dense to very dense sands and gravelly sands |
| | 434 | 30 | 13 | Stiff to very stiff fine-grained soils (sandy silts and clays) |
| | 421 | 43 | 12 | Medium dense to dense sands and silty sands |
| | 409 | 55 | 6 | Interbedded dense to very dense sands and stiff to hard silts |
| | 403 | 61 | | Bottom of CPT, possible bedrock (?) |
| CPT-2 | 463 | 0 | 18 | Medium dense sands and silty sands |
| | 445 | 18 | 24 | Sequence of interbedded layers (several feet in thickness) of dense to very dense sand and medium dense sand |
| | 421 | 42 | | Bottom of CPT |
| CPT-3 | 460 | 0 | 18 | Medium dense sands and silty sands |
| | 442 | 18 | 8 | Loose to medium dense sands, silty sands, and sandy silts |
| | 434 | 26 | 7 | Medium stiff to stiff fine-grained soils (clays and silts) |
| | 427 | 33 | 5 | Dense to very dense sands and gravelly sands |
| | 422 | 38 | | Bottom of CPT |
| CPT-4 | 459 | 0 | 3 | Dense to very dense sands and gravelly sands |
| | 456 | 3 | 8 | Interbedded medium dense sands and stiff to very stiff silts |
| | 448 | 11 | 7 | Dense sands |
| | 441 | 18 | 8 | Loose to medium dense sands, silty sands, and sandy silts |
| | 433 | 26 | 8 | Medium dense sands and silty sands |
| | 425 | 34 | 6 | Dense to very dense sands and gravelly sands |
| | 419 | 40 | | Bottom of CPT |
| CPT-5 | 459 | 0 | 9 | Dense to very dense sands and gravelly sands |
| | 450 | 9 | 4 | Very soft to medium stiff fine grained soils (clays and silts) |
| | 446 | 13 | 15 | Interbedded medium dense silty sand and stiff to very stiff sandy silt |
| | 431 | 28 | 17 | Loose to medium dense sands, silty sands, and sandy silts |
| | 414 | 45 | 1 | Very dense sand and gravelly sand |

Table 5-5: Summary of Interpreted Stratigraphy from CPT Soundings—RSE Investigation

| Exploration Number | Ground Surface Elevation (feet above MSL) | Depth to Top of Generalized Layer (feet) | Generalized Layer Thickness (feet) | Interpreted Stratigraphy and Soil Type |
|--------------------|---|--|------------------------------------|---|
| CPT-6 | 413 | 46 | | Bottom of CPT, possible bedrock (?) |
| | 469 | 0 | 7 | Medium dense to dense sands and silty sands |
| | 462 | 7 | 8 | Very stiff fine grained soils (clays and silts) |
| | 454 | 15 | 15 | Very interbedded sequence of layers (generally less than two feet in thickness) of medium dense silty sand and stiff fine-grained soils (silts, clays) |
| | 439 | 30 | 4 | Medium dense sands and silty sands |
| | 435 | 34 | 40 | Very interbedded sequence of layers (generally less than five feet in thickness) of medium dense silty sand and stiff to very stiff fine-grained soils (silts, clays) |
| | 395 | 74 | 1 | Dense to very dense sands and gravelly sands |
| | 394 | 75 | | Bottom of CPT, possible bedrock (?) |
| CPT-7A | 471 | 0 | 16 | Medium dense to dense sands and silty sands, very dense/gravelly at 4 to 5 feet |
| | 455 | 16 | 14 | Sequence of interbedded layers (several feet in thickness) of medium dense to dense sand and very stiff fine-grained soils (silts, clays) |
| | 441 | 30 | 10 | Medium dense to dense sands and silty sands |
| | 431 | 40 | 17 | Medium stiff to stiff fine-grained soils (clays and silts), with occasional thin sand layers/lenses |
| | 414 | 57 | 17 | Medium dense silty sands and sandy silts |
| | 397 | 74 | 3 | Dense to very dense sands and gravelly sands, possibly near top of bedrock. |
| | 394 | 77 | | Bottom of CPT, possibly near bedrock (?) |
| CPT-8A | 472 | 0 | 24 | Sequence of interbedded layers (several feet in thickness) of medium dense to very dense sands and silty sands |
| | 448 | 24 | 3 | Soft to very stiff fine-grained soils (silts, clays) |
| | 445 | 27 | 19 | Sequence of interbedded layers (4 to 10 feet in thickness) of medium dense to very dense sands and silty sands |
| | 426 | 46 | 19 | Sequence of interbedded layers (generally less than 1 foot in thickness) of medium dense sand and medium stiff to stiff fine-grained soils (silts, clays) |
| | 407 | 65 | | Bottom of CPT |
| | 473 | 0 | 3 | Dense to very dense sands and gravelly sand |

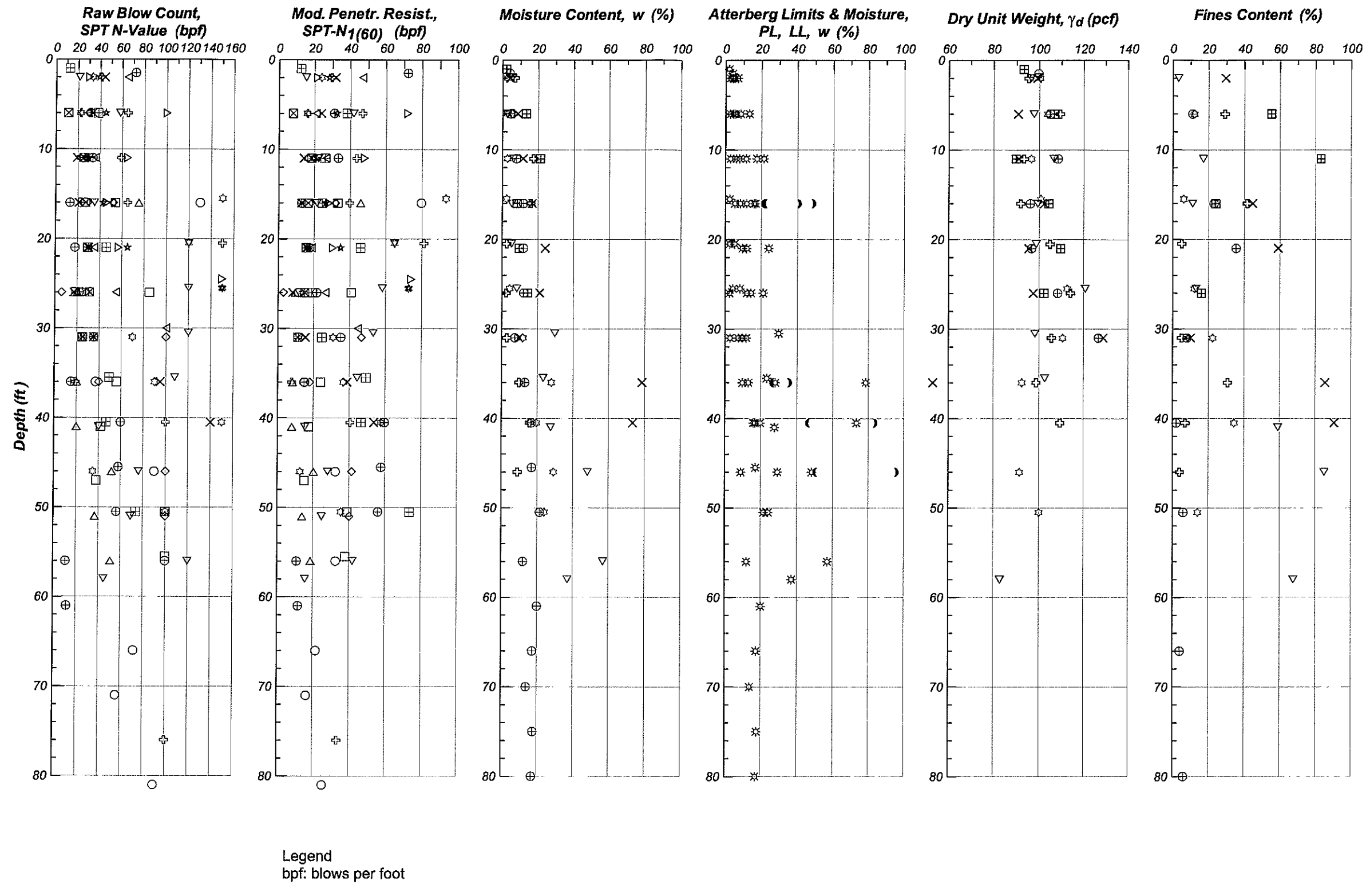
Table 5-5: Summary of Interpreted Stratigraphy from CPT Soundings--RSE Investigation


| Exploration Number | Ground Surface Elevation (feet above MSL) | Depth to Top of Generalized Layer (feet) | Generalized Layer Thickness (feet) | Interpreted Stratigraphy and Soil Type |
|--------------------|---|--|------------------------------------|---|
| | 470 | 3 | 6 | Loose to medium dense sands, silty sands, and sandy silts |
| | 464 | 9 | 14 | Stiff to very stiff fine-grained soils (sandy silts and clays) |
| | 450 | 23 | 14 | Loose sands, silty sands, and sandy silts |
| | 436 | 37 | 22 | Stiff to very stiff fine-grained soils (sandy silts and clays) |
| | 414 | 59 | 13 | Medium dense sands and silty sands |
| | 401 | 72 | 8 | Stiff to very stiff fine-grained soils (sandy silts and clays) |
| | 393 | 80 | 15 | Medium dense sands and silty sands |
| | 378 | 95 | 15 | Sequence of interbedded layers (generally less than 5 feet in thickness) of medium dense sand and stiff to very stiff fine-grained soils (silts, clays) |
| | 363 | 110 | | Bottom of CPT |
| CPT-10 | 476 | 0 | 7 | Medium dense sands and silty sands |
| | 469 | 7 | 24 | Sequence of interbedded layers (several feet in thickness) loose to medium dense silty sands and stiff to very stiff fine-grained soils (silts and clays) |
| | 445 | 31 | 37 | Medium dense to dense sands and silty sands |
| | 408 | 68 | | Bottom of CPT, possible bedrock (?) |

NOTES:

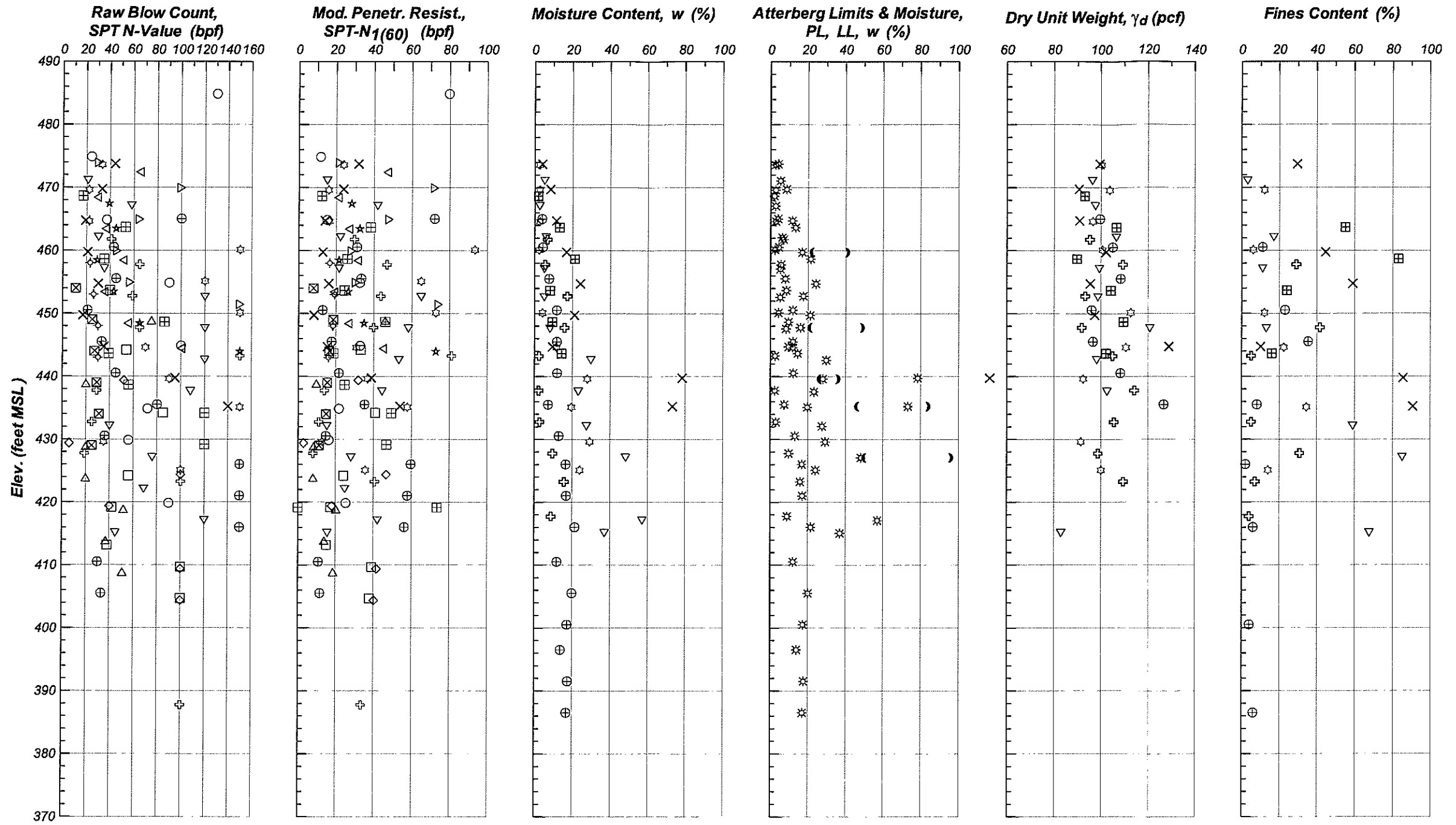
Depths and elevations were rounded off to the nearest foot.

Soil type based on CPT sounding records should be considered only as approximate interpretation. Similarly, interpretation of bedrock depth may vary widely because of soft weathered ("soil-like") bedrock conditions, like those existing at AA 3 site.




| | | |
|---|--|----------------|
| ESI Report | | Draft |
| Soil Property Characterization Data Versus Depth | | |
| Removal Site Evaluation for Anomaly Area 3 | | |
| Date: 11-03 | Former MCAS El Toro | |
| Project No. 37380 | EARTH  TECH | Figure 5-11 |
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- Boring:**
- ◇ MW01
 - MW02
 - MW03
 - △ MW04
 - ▽ MW05
 - × MW06
 - ☆ MW07
 - ⊕ MW08
 - ⊗ MW09
 - ⊕ MW10
 - ▽ PG-01
 - △ PG-02
 - ☆ PG-03
 - ※ PZ-01
 - ⊗ PZ-02
 - ◇ PZ-03



Legend
bpf: blows per foot

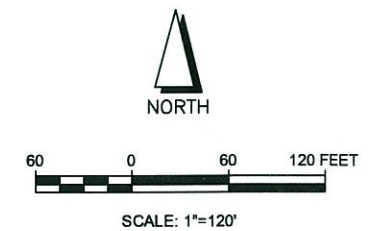
| | | | |
|---|--|-------|----------------|
| ESI Report | | Draft | |
| Soil Property Characterization Data Versus Elevation | | | |
| Removal Site Evaluation for Anomaly Area 3 | | | |
| Date: 11-03 | Former MCAS El Toro | | Figure 5-12 |
| Project No. 37380 | EARTH  TECH A tyco INTERNATIONAL LTD. COMPANY | | |



MAPPING BY LINCER AND ASSOCIATES (2002)

LEGEND

- MINOR SURFACE ELEVATION: 2-FOOT INTERVALS
- 460 — MAJOR SURFACE ELEVATION: 10-FOOT INTERVALS
- - - MCAS EL TORO BOUNDARY
- ···· — EXISTING STREAM OR WASH
- ESTIMATED EXTENT OF WASTE PLACEMENT BEFORE RSE INVESTIGATION (EARTH TECH 2001)
- MSS/NNG MIXED SAGE SCRUB/NON-NATIVE GRASSLAND
- MFS MULE FAT SCRUB
- RUD/DEV RUDERAL/DEVELOPED
- SCS SOUTHERN CACTUS SCRUB
- ▲ COASTAL CALIFORNIA GNATCATCHER
- * CACTUS WREN (PAIR)
- ⊗ CACTUS WREN NEST
- ⊙ NEOTOMA NEST



| | | | |
|--|--|-------|--------------------|
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| Habitat and Sensitive Natural Resources | | | |
| Removal Site Evaluation for Anomaly Area 3 | | | |
| Date: 11-03 | MCAS El Toro | | Figure 5-13 |
| Project No. 37380 | EARTH  TECH | | |
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5.5 HABITAT ASSESSMENT

A biological site reconnaissance (BSR) was conducted at AA 3 to provide biological input to the screening-level problem formulation for an ERA, as required by the CERCLA and in accordance with the legal requirements set forth under Section 7 of the Endangered Species Act of 1973, (19 U.S.C. 1536(c), 50 CFR 402).

The focus of this BSR is AA 3, which encompasses an area of approximately 9 acres and is located in the northwestern section of the former MCAS El Toro facility near Pusan Way, adjacent to the Agua Chino Wash (Figure 1-1). The site is accessible by vehicle over various paved roads. A fence surrounds the area with a portion of the site located outside the fence. The study site is mostly flat in the center with some gently rolling hills around the periphery.

5.5.1 Methods and Limitations

A review of the California Natural Diversity Data Base (CNDDDB 2001a and 2001b) for USGS El Toro, Canada Gobernadora, San Juan Capistrano, and Santiago Peak 7 1/2' topo quadrangles, the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants of California (Tibor 2001), the CNPS Electronic Inventory (2001, for the same quadrangles), and the compendia of special status species published by the U.S. Fish and Wildlife Service (FWS) (1993a and 1996) and California Department of Fish and Game (CDFG [2002]) was conducted. Reports specific to former MCAS El Toro, including that by the USFWS (1993b), were also reviewed.

5.5.2 Botanical Survey

On 9 October 2002 and 7 June 2003, the project botanist, surveyed the site for special status plants, evaluated habitat suitability for other special status plants, and mapped and described vegetation. The entire area was walked, species present noted, and vegetation types mapped for the site and adjacent areas. Habitat types on the site were visited on foot and plant species observed were recorded in field notes. Plants of uncertain identity were collected and subsequently identified from keys, descriptions, and illustrations in Abrams (1923, 1944, and 1951), Abrams and Ferris (1960), Hickman (1993) and Munz (1974). A list of all plant species observed is presented in Table 5-6. Fieldwork was completed during two different seasons, during which a variety of plants could be identified. Thus, occurrence probability for special status plants is based on both habitat conditions and presence or absence documented by field surveys. Mapping was done on a recent aerial photo and topographic map. Vegetation types follow the Orange County Habitat Classification System (OCHCS) nomenclature and plant names generally follow Hickman (ed.) 1993.

Table 5-6: All Plant Species Found On and/or Adjacent to AA 3

| Latin Name | Common Name | Occurrence | |
|--|-------------------------------|------------|----------|
| | | On site | Adjacent |
| Vascular Plants | | | |
| CUPRESSACEAE | CYPRESS FAMILY | | |
| <i>Cupressus</i> sp. | Unid. escaped ornamentals (2) | | X |
| <i>Juniperus californica</i> | California juniper | | |
| AIZOACEAE | ICEPLANT FAMILY | | |
| * <i>Carpobrotus edulis</i> (?) | Hottentot fig | | X |
| ANACARDIACEAE | CASHEW FAMILY | | |
| <i>Malosma laurina</i> (<i>Rhus laurina</i>) | Laurel sumac | | X |
| * <i>Schinus molle</i> | Peruvian pepper tree | | X |
| * <i>Schinus terebinthifolius</i> | Brazilian pepper tree | | X |
| <i>Toxicodendron diversilobum</i> | Poison oak | | X |

Table 5-6: All Plant Species Found On and/or Adjacent to AA 3

| Latin Name | Common Name | Occurrence | |
|--|----------------------------|--------------------------|----------|
| | | On site | Adjacent |
| Vascular Plants | | | |
| APIACEAE | CELERY FAMILY | | |
| * <i>Foeniculum vulgare</i> | Fennel | X | |
| ASCLEPIADACEAE | MILKWEED FAMILY | | |
| <i>Sarcostemma cynanchoides</i> | Climbing milkweed | | X |
| ASTERACEAE | ASTER FAMILY | | |
| <i>Ambrosia acanthicarpa</i> | Annual sandbur | X | |
| <i>Ambrosia psilostachya</i> | Western ragweed | X | |
| <i>Artemisia californica</i> | California sagebrush | | X |
| <i>Artemisia douglasiana</i> | Douglas mugwort | | X |
| <i>Artemisia dracunculus</i> | Tarragon | X | |
| <i>Baccharis pilularis</i> | Coyote bush | | X |
| <i>Baccharis salicifolia</i> | Mulefat | X | X |
| <i>Brickellia californica</i> | Calif. brickellbush | | X |
| * <i>Centaurea melitensis</i> | Tocalote | X | |
| * <i>Chamomilla suaveolens</i> (<i>Matricaria matricarioides</i>) | Pineapple weed | X | |
| * <i>Chrysanthemum coronarium</i> | Garland daisy | X | |
| * <i>Cnicus benedictus</i> | Blessed thistle | X | |
| <i>Conyza canadensis</i> | Horseweed | X | |
| * <i>Cynara cardunculus</i> | Artichoke thistle, cardoon | X | |
| <i>Encelia californica</i> | California encelia | X | |
| * <i>Filago gallica</i> | Narrow-leaved filago | X | |
| <i>Gnaphalium sp.</i> | Unid. annual | X | |
| <i>Gnaphalium californicum.</i> | California everlasting | X | |
| <i>Helianthus annuus</i> | Annual sunflower | X | |
| <i>Hemizonia fasciculata</i> (<i>Deinandra fasciculata</i>) | Fascicled tarplant | X | |
| <i>Heterotheca grandiflora</i> | Telegraph weed | X | |
| <i>Isocoma menziesii</i> (<i>Haplopappus venetus</i>) | Coast goldenbush | X | |
| <i>Lepidospartum squamatum</i> | Scalebroom | | X |
| * <i>Matricaria globifera</i> (?) | Stink-net | X (Irono 43:528 1996) | |
| <i>Pluchea sericea</i> (?) | Arrow weed | | X |
| * <i>Pulicaria paludosa</i> | Spanish sunflower | | X |
| <i>Xanthium strumarium</i> | Cocklebur | | X |
| BORAGINACEAE | BORAGE FAMILY | | |
| <i>Amsinckia menziesii</i> | Rancher's fiddleneck | X | |
| BRASSICACEAE | MUSTARD FAMILY | | |
| * <i>Brassica geniculata</i> (<i>Hirschfeldia incana</i>) | Short-pod mustard | X | |
| * <i>Brassica nigra</i> | Black mustard | X | |
| * <i>Raphanus sativus</i> | Wild radish | X | |

Table 5-6: All Plant Species Found On and/or Adjacent to AA 3

| Latin Name | Common Name | Occurrence | |
|--|--|------------|----------|
| | | On site | Adjacent |
| CACTACEAE | CACTUS FAMILY | | |
| <i>Opuntia littoralis</i> ssp. <i>littoralis</i> | Coast prickly pear | X | |
| <i>Opuntia oricola</i> (?) | Oracle cactus | | X |
| <i>Opuntia prolifera</i> | Coastal cholla | | X |
| CAPRIFOLIACEAE | HONEYSUCKLE FAMILY | | |
| <i>Sambucus mexicana</i> | Mexican elderberry | | X |
| CHENOPODIACEAE | GOOSEFOOT FAMILY | | |
| * <i>Atriplex semibaccata</i> | Australian saltbush | X | |
| * <i>Atriplex suberecta</i> | Australian saltbush | X | |
| * <i>Chenopodium album</i> (?) | Common goosefoot | X | |
| * <i>Salsola tragus</i> | Russian thistle, tumbleweed | X | |
| CRASSULACEAE | STONECROP FAMILY | | |
| <i>Dudleya pulverulenta</i> | Chalk dudleya | | X |
| CUCURBITACEAE | CUCUMBER FAMILY | | |
| <i>Cucurbita foetidissima</i> | Calabazilla | | X |
| CUSCUTACEAE | DODDER FAMILY | | |
| <i>Cuscuta subinclusa</i> (C. <i>ceanothi</i>) | Dodder (on <i>Malosma</i> , <i>Nicotiana</i>) | | X |
| EUPHORBIACEAE | SPURGE FAMILY | | |
| <i>Croton californicus</i> | California croton | X | |
| <i>Eremocarpus setiger</i> | Doveweed | X | |
| * <i>Ricinus communis</i> | Castor bean | X | |
| FABACEAE | PEA FAMILY | | |
| * <i>Acacia</i> sp. | Unid. escaped ornamental | X | |
| <i>Lotus purshianus</i> (L. <i>unifolius</i>) | "Spanish" clover | X | |
| <i>Medicago polymorpha</i> | Bur-clover | X | |
| * <i>Melilotus alba</i> | White sweet-clover | X | |
| * <i>Melilotus indica</i> | Yellow sweet-clover | X | |
| GERANIACEAE | GERANIUM FAMILY | | |
| * <i>Pelargonium</i> | Ornamental geranium | | X |
| LAMIACEAE | MINT FAMILY | | |
| * <i>Marrubium vulgare</i> | Horehound | X | |
| <i>Salvia mellifera</i> | Black sage | | X |
| MALVACEAE | MALLOW FAMILY | | |
| * <i>Malva parviflora</i> | Cheeseweed | X | |
| MYRTACEAE | EUCALYPTUS FAMILY | | |
| * <i>Eucalyptus globulus</i> (?) | Red gum, red river gum | | X |
| OLEACEAE | OLIVE FAMILY | | |
| * <i>Fraxinus udhei</i> | Shamel ash (escaped ornamental) | | X |
| PLATANACEAE | SYCAMORE FAMILY | | |
| <i>Platanus racemosa</i> | California sycamore | | X |
| POLYGONACEAE | BUCKWHEAT FAMILY | | |
| <i>Eriogonum fasciculatum</i> | California buckwheat | | X |
| * <i>Rumex crispus</i> | Curly dock | | X |

Table 5-6: All Plant Species Found On and/or Adjacent to AA 3

| Latin Name | Common Name | Occurrence | |
|--|------------------------------|------------|----------|
| | | On site | Adjacent |
| Vascular Plants | | | |
| ROSACEAE | ROSE FAMILY | | |
| <i>Heteromeles arbutifolia</i> | Toyon, Christmas berry | | X |
| SALICACEAE | WILLOW FAMILY | | |
| <i>Salix goodingii</i> | Black willow | | X |
| SCROPHULARIACEAE | SNAPDRAGON FAMILY | | |
| <i>Keckiella antirrhinoides</i> | Yellow bush-penstemon | | X |
| SOLANACEAE | NIGHTSHADE FAMILY | | |
| <i>Datura wrightii</i> (<i>D. meteloides</i>) | Jimsonweed | X | |
| * <i>Nicotiana glauca</i> | Tree tobacco | X | |
| <i>Solanum douglasii</i> | Nightshade | X | |
| TAMARICACEAE | TAMARISK FAMILY | | |
| * <i>Tamarix ramosissima</i> | Mediterranean tamarisk | | X |
| ULMACEAE | ELM FAMILY | | |
| * <i>Ulmus parviflora</i> | Chinese elm | | X |
| VITACEAE | GRAPE FAMILY | | |
| <i>Vitis girdiana</i> | Wild grape | X | |
| ARECACEAE | PALM FAMILY | | |
| * <i>Phoenix canariensis</i> | Canary Island palm | | X |
| * <i>Washingtonia robusta</i> | Fan palm | X | |
| * <i>Yucca aloifolia</i> | Spanish bayonet (ornamental) | | X |
| POACEAE | GRASS FAMILY | | |
| * <i>Avena barbata</i> | Wild oat | X | |
| * <i>Bromus diandrus</i> | Ripgut brome | | X |
| * <i>Bromus hordeaceus</i> (<i>B. mollis</i>) | Soft chess | X | |
| * <i>Bromus madritensis</i> <i>ssp. rubens</i> (<i>B. rubens</i>) | Red brome | X | |
| * <i>Cynodon dactylon</i> | Bermuda grass | | X |
| <i>Elymus condensatus</i> (<i>Leymus condensatus</i>) | Giant wild rye | | X |
| * <i>Lamarckia aurea</i> | Goldentop grass | X | |

NOTES: *Alien species indicated by asterisk. This list includes only species observed on the site. Others may have been overlooked or unidentifiable due to season. Plants were identified using keys, descriptions, and illustrations in Abrams (1923-1951), Hickman (1993), and Munz (1974). Taxonomy and nomenclature generally follow Hickman.

5.5.3 Wetlands and Waters of the U.S.

The project botanist conducted the potential wetlands and waters mapping on 9 October 2002. That mapping provided a basis for evaluating if these resources are potentially present and if so, where they are located. On 7 June 2003, the project botanist conducted a formal delineation.

Section 404 of the Federal Clean Water Act requires permitting of activities that would result in discharge of dredge or fill material into jurisdictional waters of the U.S. or adjacent wetlands. Federal policy directs no net loss of wetland habitats. Section 1603 of the California Fish and Game code requires a Streambed Alteration Agreement for projects that would alter a stream channel. Depending on its implementation, future remediation at the site could alter or place fill material in eroded drainage channels and, under other circumstances, could come under jurisdiction of one or

both agencies. However, for federal actions, the State 1603 process may not apply. This report identifies if jurisdictional waters of the U.S. occur on the site and determines their wetland status, based on the Army Corps of Engineers (USACE) Wetlands Delineation Manual (Department of the Army Environmental Laboratory 1987) for the purpose of permit application under the Federal Clean Water Act. The areas identified here as waters of the U.S. are also considered streambeds under state policy.

5.5.3.1 JURISDICTIONAL CRITERIA

Section 404 of the Federal Clean Water Act applies to waters of the U.S. By definition, these include waterways, streams, and intermittent streams and their tributaries that could be used for interstate commerce. In non-tidal waters, the limits of jurisdiction are ordinary high water marks (OHWMs), such as stream banks. Where wetlands occur above high tide or high water marks, they are considered adjacent wetlands and are included within Army Corps jurisdiction.

The term "interstate commerce" has been broadly interpreted to include use by migratory waterfowl or out-of-state tourists, and Army Corps jurisdiction has often been extended to wetlands not adjacent to waters of the U.S. (isolated wetlands). More recently, a court decision determined that the migratory bird nexus alone did not give the Corps jurisdiction on a particular intrastate waters site in Illinois (Cite Reference).

Section 1603 of the State Fish and Game Code, if relevant in this case, is applied to stream channels, defined elsewhere in the Code as follows:

"A stream is a body of water that flows at least periodically...through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation."

The state definition does not specify a flow rate or inundation frequency, and provides no clear distinction between jurisdictional and non-jurisdictional lands. The field survey for this report covered all low areas, swales, and drainage ways where water could pond or flow.

5.5.3.2 VALUATION CRITERIA

The Army Corps evaluates wetlands by three criteria: hydrology, soils, and vegetation. Under the federal delineation procedure, a site must normally satisfy all three criteria to be classified as a wetland. At its discretion, and if it were to be involved in this process, the CDFG may regard a site as a wetland based on any one of the three criteria.

The hydrology criterion evaluates the presence of water based on simple observation or on indirect evidence such as high water marks, drift lines or sediment deposits. The soils criterion is based on hydric soil characteristics, such as certain colors and mottling, which develop under wetlands conditions. The vegetation criterion evaluates plant species growing on a site. Most plants cannot survive extended periods of root saturation, and are called "obligate upland" species (UPL). Others grow almost exclusively in wetlands habitats, or on both wetlands and uplands. These are called "obligate wetlands" (WET) or "facultative wetlands" (FACW) species, respectively, in Wetland Plants in California (Appendix O to the Delineation Manual).

5.5.4 Wildlife Survey

On 9 October 2002, the project wildlife biologist and project manager, conducted a preliminary onsite survey of the site and adjacent lands for special status animals that would be observable this time of year, evaluated habitat suitability for other special status animals, and mapped the location of

any sensitive wildlife resources noted. On 23 October 2002 and 7 June 2003, the project wildlife biologist conducted a more formal general biological survey. On 23 October 2002, the weather conditions for temperature and wind ranged from 58 °F to 75 °F and 1 mph to 7 mph, respectively, with 100% overcast to clear sky conditions. On 7 June 2003, the weather conditions for temperature and wind ranged from 68 °F to 74 °F and 1 mph to 7 mph, respectively, with 10 to 100 percent overcast conditions. The entire parcel was traversed by foot, using meandering transects. Each habitat type was examined for signs (i.e., tracks and scat) and regular five-minute stops were made to look and listen for birds and other wildlife. In offsite areas that contained gnatcatcher habitat, a recording of their calls was played periodically. The surveys were not intended to be at the focused or protocol level. However, all observed species, either listed or considered sensitive, were noted (Table 5-7). The basis for field identification and scientific nomenclature used in this report is from the following references: amphibians and reptiles (Stebbins 1985); birds (American Ornithologists' Union 1983 and 1989); and mammals (Jones et al. 1982 and Murie 1954).

Table 5-7: Wildlife Species Documented On and Adjacent to AA 3

| Taxonomic Group (1) | Scientific Name (1) | Habitat (2) | Status (3,4) |
|---|--------------------------------|-------------|--------------|
| REPTILES | | | |
| Iguanidae – Iguanids | | | |
| Western fence lizard | <i>Sceloporus occidentalis</i> | CHP, RSS | S, W |
| Side-blotched lizard | <i>Uta stansburiana</i> | CHP, RSS | S, W |
| AMPHIBIANS | | | |
| Hylidae Treefrogs and Relatives | | | |
| Pacific tree frog | <i>Hyla regilla</i> | G, D | W |
| BIRDS | | | |
| Cathartidae - American Vultures | | | |
| Turkey vulture | <i>Cathartes aura</i> | Flying | S, W |
| Accipitridae - Hawks, Old World Vultures, and Harriers | | | |
| Red-tailed hawk | <i>Buteo jamaicensis</i> | RSS, G | S, W |
| Red-shouldered hawk | <i>Buteo lineatus elegans</i> | RP, Flying | W |
| Cooper's hawk | <i>Accipiter cooperii</i> | RSS, Flying | W, † |
| Falconidae - Caracaras and Falcons | | | |
| American kestrel | <i>Falco sparverius</i> | RSS, G | W |
| Phasianidae - Quails, Pheasants, and Relatives | | | |
| California quail | <i>Callipepla californica</i> | CHP, RSS | S, W |
| Charadriidae – Plovers and Relatives | | | |
| Killdeer | <i>Charadrius vociferous</i> | D | W |
| Columbidae - Pigeons and Doves | | | |
| Mourning dove | <i>Zenaida macroura</i> | D, RSS | S, B, W |
| Rock dove | <i>Columbia livia</i> | DEV | S, W |
| Trochilidae – Hummingbirds | | | |
| Anna's hummingbird | <i>Calypte anna</i> | CHP, RSS | S, W |
| Tyrannidae – Flycatchers | | | |
| Western kingbird | <i>Tyrannus verticalis</i> | RSS, D, G | W |
| Tyrannidae - Tyrant Flycatchers | | | |
| Black phoebe | <i>Sayornis nigricans</i> | G, D | S, W |
| Say's phoebe | <i>Sayornis saya</i> | G | W |
| Cassin's kingbird | <i>Tyrannus vociferans</i> | D | S |
| Ash-throated flycatcher | <i>Myiarchus cinerascens</i> | D | |

Table 5-7: Wildlife Species Documented On and Adjacent to AA 3

| Taxonomic Group (1) | Scientific Name (1) | Habitat (2) | Status (3,4) |
|--|---|--------------|--------------|
| Swallows | | | |
| Cliff swallow | <i>Hirundo pyrrhonota</i> | Flying | S |
| Corvidae - Jays, Magpies, and Crows | | | |
| Scrub jay | <i>Aphelocoma coerulescens</i> | CHP, RSS, RP | S, W |
| American crow | <i>Corvus brachyrhynchos</i> | Flying | S |
| Common raven | <i>Corvus corax</i> | RSS, CHP | W |
| Aegithalidae – Bushtit | | | |
| Bushtit | <i>Psaltirparus minimus</i> | RSS, CHP, RP | S, W |
| Trogliditidae – Wrens | | | |
| Bewick's wren | <i>Thryomanes bewickii</i> | RSS | S, W |
| Cactus wren | <i>Campylorhynchus brunneicapillus</i> | CSS | S, W, B, † |
| Muscicapidae - Old World Warblers, Gnatcatchers, Kinglets, Thrushes, Bluebirds, and Wrentit | | | |
| Coastal California gnatcatcher | <i>Poliottila californica californica</i> | RSS | S, W, † |
| Wrentit | <i>Chamaea fasciata</i> | RSS, CHP | S, W |
| Mimidae - Mockingbirds and Thrashers | | | |
| Northern mockingbird | <i>Mimus polyglottos</i> | RSS, D | S, W |
| California thrasher | <i>Toxostoma redivivum</i> | RSS, CHP | S, W |
| Silky-Flycatchers | | | |
| Phainopepla | <i>Phainopepla nitens</i> | D | S |
| Starlings | | | |
| European starling | <i>Sturnus vulgaris</i> | D | S |
| Emberizidae - Warblers, Sparrows, and Relatives | | | |
| Yellow-rumped Warbler | <i>Dendroica coronata</i> | RP | W |
| Wilson's warbler | <i>Wilsonia pusilla</i> | RP | V |
| California towhee | <i>Pipilo crissalis</i> | RSS, CHP | S, W |
| Spotted towhee | <i>Pipilo maculatus</i> | RSS, RP, CHP | S, W |
| White-crowned sparrow | <i>Zonotrichia leucophrys</i> | RSS | V |
| Song Sparrow | <i>Melospiza melodia</i> | RSS | |
| Fringillidae – Finches | | | |
| House finch | <i>Carpodacus mexicanus</i> | RSS, D | S, W |
| Blackbirds and Orioles | | | |
| Hooded Oriole | <i>Icterus cucullatus</i> | RP | S |
| Finches | | | |
| Lesser goldfinch | <i>Carduelis psaltria</i> | RP | S |
| MAMMALS | | | |
| Canidae - Foxes, Wolves, and Relatives | | | |
| Coyote | <i>Canis latrans</i> | CHP, RSS | W |
| Sciuridae – Squirrels | | | |
| California ground squirrel | <i>Spermophilus beecheyi</i> | CHP, RSS | S, W |
| Geomyidae - Pocket Gophers | | | |
| Botta's pocket gopher | <i>Thomomys bottae</i> | CHP, RSS | W |
| Leporidae - Rabbits and Hares | | | |
| Desert cottontail | <i>Sylvilagus auduboni</i> | RSS, G | S, W |
| Cricetidae – Native Mice, Rats, and Voles | | | |

Table 5-7: Wildlife Species Documented On and Adjacent to AA 3

| Taxonomic Group (1) | Scientific Name (1) | Habitat (2) | Status (3,4) |
|--------------------------------|----------------------------------|-------------|--------------|
| San Diego desert woodrat | <i>Neotoma lepida intermedia</i> | CHP, RP | B, † |
| Kangaroo rat (species unknown) | (Unknown) | G | S |

NOTES:

1. Nomenclature from American Ornithologists' Union (1983); Collins (1990); Jones, et al. (1982).
2. Habitat acronyms: CHP, chaparral; W, woodland; RSS, sage scrub; G, non-native grassland; RP, riparian; D, disturbed; DEV, developed.
3. Status acronyms: B – breeding onsite ; V – visitor, migrant, or transient; W – winter observation; S – summer observation.
4. † = Sensitive species.

5.5.5 Results

5.5.5.1 LITERATURE/DATA SEARCH

All species identified by this literature review, as well as others known from the general region, were searched for during this assessment. Those not observed, but having potential to be onsite, are listed in Table 5-8 (plants) and Table 5-9 (wildlife). These tables list special status species known from comparable habitats within the region and summarize their natural history, agency status, and occurrence probability onsite. Figure 5-13 presents the results of the assessment.

5.5.5.2 FLORA

Eighty-five plant species were observed, with 40 of these (47 percent) being exotic or non-native species (Table 5-6). Most of the species observed were typical for the southern California habitats and disturbed areas.

5.5.5.3 HABITAT

Most of the site (9.60 acres within AA 3) is "ruderal" vegetation (OCHCS 4.6) (Figure 5-13).

There is an intermittent stream channel parallel to, and inside, the northeastern site border and outside the southeastern boundary, the latter of which supports Mulefat Scrub (OCHCS 7.3) with scattered large black willows. These willow trees are in a few patches and do not cover enough of the area to match OCHCS descriptions of Southern Willow Scrub or Southern Black Willow forest. Open patches of Mulefat scrub extend onto the project site itself in a few areas along the southeastern boundary. The area of Mulefat Scrub within AA 3 is 0.08 acre.

A form of coastal sage scrub (CSS) occurs on a hillside offsite to the northwest, and degraded CSS, mixed with non-native grassland, occurs on a fill slope to the east, crossing the northeastern corner of the site and extending offsite to the south and southeast. The CSS offsite to the north matches OCHCS description of Southern Cactus Scrub (OCHCS 2.4). Degraded CSS matches the mixed sage scrub grassland (OCHCS 2.8.5).

5.5.5.4 WETLANDS AND WATERS OF THE U.S.

Hydrology. The field survey for this report covered all low areas, swales, and drainage ways where water could pond or flow. One of these areas, the small head cut drainage area on the southeastern boundary of the site, shows evidence of an ordinary high water mark (OHWM) and is considered waters of the U.S. under Section 404 of the Federal Clean Water Act and a streambeds under Section 1603 of the California Fish and Game Code. The OHWM in this drainage way is about 5 feet wide and extends over a length of about 70 feet. Other areas, including low-lying areas and a swale parallel to the northeastern site boundary, show no OHWMs.

Table 5-8: Special Status Plants Potentially Present at AA 3

| Special Status Plants | Habitat and Distribution | Flower season | Status Designation | Occurrence Probability |
|---|--|---------------|--|--|
| <i>Brodiaea filifolia</i> Thread-leaved brodiaea | Vernal pools and alkali sink in inland valleys; also on upland mesic clay soils nearer coast; hot spring soils at Arrowhead Hot Springs; scattered locations in foothills and valleys (Los Angeles County to San Bernardino, S to San Diego Counties), below 2,000 feet elevation. | May–June | Federal: THR California: S2.1 END CNPS: List 1B R-E-D: 3-3-3 | Absent (field survey; no suitable soils or mesic habitat; habitat not suitable due to land uses) |
| <i>Calochortus plummerae</i> Plummer's mariposa lily | Chaparral, pine forest, below about 5,500 feet elevation; widespread but uncommon throughout Southern California mountains, foothills, and valleys. | May–July | Federal: none California: S3.2 CNPS: List 1B R-E-D: 2-2-3 | Absent (field survey; habitat unsuitable due to land uses) |
| <i>Calochortus weedii</i> var. <i>intermedius</i> Weed's mariposa lily | Chaparral, coastal sage scrub, valley grassland, sandy or clay soils, below about 6,200 feet elevation; coastal southern and central California counties. | June–Aug. | Federal: none California: S2.2 CNPS: List 1B R-E-D: 2-2-3 | Absent (field survey; habitat unsuitable due to land uses) |
| <i>Chorizanthe parryi</i> var. <i>fernandina</i> San Fernando Valley spineflower | Shrub lands; historically from San Fernando Valley, adjacent foothills, and coastal Orange County; only known occurrence in eastern Ventura County and adjacent Los Angeles County. | April–June | Federal: candidate California: END S1.1 CNPS: List 1B R-E-D: 3-3-3 | Absent (field survey; habitat unsuitable due to land uses; presumed extinct locally) |
| <i>Comarostaphylos diversifolia</i> ssp. <i>diversifolia</i> Summer holly | Chaparral below about 1,800 feet elevation; Orange, west San Diego County, and northwest Baja California. | April–June | Federal: none Calif.: S2.2 CNPS: List 1B R-E-D: 2-2-2 | Absent (field survey) |
| <i>Dudleya cymosa</i> ssp. <i>ovatifolia</i> Santa Monica Mountains Dudleya | Shaded, rocky slopes below about 1,600 feet elevation; most records are from Santa Monica Mountains, but also recorded from Modjeska Canyon. | March–May | Federal: THR California: S2.2 CNPS: List 1B R-E-D: 3-2-3 | Absent (field survey, no suitable habitat) |
| <i>Dudleya multicaulis</i> Many-stemmed dudleya | Heavy soils, often clay, grassland or shrub land below about 2,600 feet elevation; Los Angeles to San Diego Counties, inland to San Gabriel Mountain foothills and west Riverside Counties. | May–June | Federal: none California: S2.1 CNPS: List 1B R-E-D: 1-2-3 | Absent (field survey; habitat unsuitable due to land uses) |

Table 5-8: Special Status Plants Potentially Present at AA 3

| Special Status Plants | Habitat and Distribution | Flower season | Status Designation | Occurrence Probability |
|---|--|---------------|---|--|
| <i>Dudleya stolonifera</i> Laguna Beach dudleya | North facing cliffs and rocky outcrop; endemic to San Joaquin Hills area. | May–July | Federal: THR California: THR S1.1 CNPS: List 1B R-E-D: 3-3-3 | Absent (field survey, no suitable habitat) |
| <i>Hemizonia parryi</i> ssp. <i>australis</i> (<i>Centromadia</i> <i>parryi australis</i> ; <i>Hemizonia australis</i>) Southern tarplant | Valley grasslands, vernal pools, margins of coastal wetlands; sea level to about 1,400 ft. elevation; Santa Barbara County southern to northern Baja California. | June–Sept | Federal: none California: S2.1 CNPS: List 1B R-E-D: 3-3-2 | Absent (field survey; habitat unsuitable due to land uses) |
| <i>Monardella hypoleuca</i> ssp. <i>lonata</i> Felt-leaved monardella | Chaparral, about 1,000-1,400 feet elevation; mountains of Orange (from Santiago Park area and south) and San Diego County to northern Baja California. | June–July | Federal: none California: S2.2 CNPS: List 1B R-E-D: 2-2-2 | Absent (field survey, no suitable habitat) |

NOTES:

General references: CNDDDB 2003, CNPS 2003, Hickman 1993, Munz 1974, Roberts 1998, Tibor 2001, USFWS 1999

Federal designations: (federal Endangered Species Act, U.S. FWS). Note that some agencies, but not U.S. FWS, continue to use "SOC" as a federal status designation. Until 1996, USFWS maintained a list of "category 2 candidates," described as species of concern, but for which insufficient data were available to support listing. This list is no longer maintained and FWS has no "SOC" category.

END: Federally listed, endangered

THR: Federally listed, threatened

Candidate: Sufficient data are available to support federal listing, but not listed at this time

Proposed: Formally proposed for federal status shown

State designations: (California Endangered Species Act, CDFG)

END: State listed, endangered

THR: State listed, threatened

RARE: State listed as rare (Listed "rare" animals have been re-designated as threatened, but rare plants have retained the rare designation)

CSC: Species of special concern

CDF&G Natural Diversity Data Base Designations: Applied to special status plants and sensitive plant communities; where correct category is uncertain, CDF&G uses two categories or question marks.

S1: Fewer than 6 occurrences or fewer than 1,000 individuals or less than 2,000 acres

S1.1: Very threatened

S1.2: Threatened

S1.3: No current threats known

S2: 6 to 20 occurrences or 1,000 to 3,000 individuals or 2000 to 10,000 acres (decimal suffixes same as above)

S3: 21 to 100 occurrences or 3,000 to 10,000 individuals or 10,000 to 50,000 acres (decimal suffixes same as above)

S4: Apparently secure in California; this rank is clearly lower than S3 but factors exist to cause some concern, i.e., there is some threat or somewhat narrow habitat. No threat rank

S5: Demonstrably secure or ineradicable in California. No threat rank.

CNPS designations

Note: CNPS (Tibor, ed., 2001 p. 54-55) asserts that plants on Lists 1A, 1B, and 2 meet definitions as threatened or endangered and "are eligible" for state listing

- List 1A: Plants presumed extinct in California
- List 1B: Plants rare and endangered in California and throughout their range
- List 2: Plants rare, threatened, or endangered in California, but more common elsewhere in their range
- List 3: Plants about which we need more information; a review list
- List 4: Plants of limited distribution; a watch list

CNPS R-E-D Code:

Rarity

- 1: Rare, but sufficient numbers and distribution that the potential for extinction is presently low
- 2: Occurrence confined to several populations or one extended population
- 3: Occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported

Endangerment

- 1: Not endangered
- 2: Endangered in a portion of its range
- 3: Endangered throughout its range

Distribution

- 1: More or less widespread outside California
- 2: Rare outside California
- 3: Endemic to California (i.e., does not occur outside California)

Definitions of occurrence probability:

- Occurs :** Observed on the site by qualified biologists
- High:** Observed in similar habitat in region by qualified biologists, or habitat on the site is a type often utilized by the species and the site is within the known range of the species
- Moderate:** Reported sightings in surrounding region, or site is within the known range of the species and habitat on the site is a type occasionally used by the species
- Low:** Site is within the known range of the species but habitat on the site is rarely used by the species
- Absent:** A focused study failed to detect the species, or, no suitable habitat is present
- Unknown:** No focused surveys have been performed in the region, and the species' distribution and habitat are poorly known

Table 5-9: Sensitive Animals Potentially Present but Not Observed at AA 3

| Common Name | Listing Status (1) | Potential To Occur On Site |
|--------------------------------|--------------------|---|
| Invertebrates | | |
| Quino Checkerspot | FE | Low; primary food resource not observed onsite. Regionally extinct. |
| San Diego fairy shrimp | FE | Low; no appropriate habitat onsite. |
| Riverside fairy shrimp | FE | Low; no appropriate habitat onsite. |
| Reptiles and Amphibians | | |
| San Diego horned lizard | SOC; CSC | Low; no appropriate habitat onsite. |
| Orange-throated whiptail | SOC; CSC | Low; no appropriate habitat onsite. |

Table 5-9: Sensitive Animals Potentially Present but Not Observed at AA 3

| Common Name | Listing Status (1) | Potential To Occur On Site |
|----------------------------------|---------------------------------|---|
| Silvery legless lizard | SOC; CSC | Low; no appropriate habitat onsite. |
| San Bernardino ringneck snake | SOC | Low; no appropriate habitat onsite. |
| Coast patch-nosed snake | SOC; CSC | Low; no appropriate habitat onsite. |
| Two-striped garter snake | CSC | Medium; limited appropriate habitat onsite. |
| Northern red diamond rattlesnake | SOC; CSC | Low; no appropriate habitat onsite. |
| Western spadefoot | SOC; CSC | Low; no appropriate habitat onsite. |
| Arroyo southwestern toad | FE; CSC | Low; limited suitable habitat. |
| Birds | | |
| Least Bell's vireo | FE; CE | Low; no appropriate habitat onsite. |
| Yellow Breasted chat | CSC | Low; no appropriate habitat onsite. |
| Bell's sage sparrow | SOC; CSC | Low; no appropriate habitat onsite. |
| Loggerhead shrike | SOC; CSC | Medium in suitable habitat; observed nearby. |
| California horned lark | CSC | Low; no appropriate habitat onsite. |
| Tri-colored blackbird | SOC; CSC | High; suitable habitat. |
| Yellow warbler | CSC | Low; no appropriate habitat onsite. |
| White-tailed kite | CSC; FP | High; observed nearby. |
| Northern harrier | CSC | High; observed nearby. |
| Sharp-shinned hawk | CSC | High in winter; observed nearby. |
| Ferruginous hawk | SOC | High in winter; recently observed over adjacent parcel. |
| Merlin | CSC | Medium in winter; suitable habitat and prey. |
| Prairie falcon | CSC | Low; no appropriate habitat onsite. |
| Swainson's hawk | CT | Low; uncommon migrant. |
| Golden eagle | Eagle Act; CSC/FP | Low; no appropriate habitat onsite. |
| American peregrine falcon | Federally delisted; CE | Low; no suitable prey or habitat. |
| Short-eared owl | CSC | Low; limited habitat but prey available. |
| Burrowing owls | CSC; state internal memorandum. | Low; no appropriate habitat onsite. |
| Mammals | | |
| San Diego pocket mouse | CSC | Low; limited habitat onsite. |
| Southern grasshopper mouse | CSC | Low; very rare in region. |

Table 5-9: Sensitive Animals Potentially Present but Not Observed at AA 3

| Common Name | Listing Status (1) | Potential To Occur On Site |
|--------------------------|--------------------|--|
| Los Angeles pocket mouse | CSC | Low; limited suitable habitat. |
| Stevens' Kangaroo Rat | FE; CE | Low; limited habitat and food onsite. Not known from area. |
| Mountain lion | FP | Low; limited habitat and prey onsite. |
| Pallid bat | CSC | Low; limited habitat. |
| Townsend's big-eared bat | SOC; CSC | Low; limited habitat. |
| California mastiff bat | SOC; CSC | Low; limited habitat. |
| American badger | CSC | Low; limited habitat and prey onsite. |

NOTES:

FE Federally Endangered
SOC Federal Species of Concern/Sensitive
CE California Endangered
CSC California species of special concern
FP California Fully Protected

Soils. Soil on the anomaly area is fill material, and soil is composed of fine sand in the drainage way showing OHWMs (above). Sandy soils generally do not show hydric indicators even where they are native on a site. Because of the sandy soil texture and because the soil is not native to the site, we did not attempt to find indicators of hydric soils.

Vegetation. Plants growing in the low-lying areas on the Anomaly Area surface are generally weedy native and non-native upland species, including red brome grass (*Bromus madritensis ssp. rubens*), tocalote (*Centaurea melitensis*), sweetclover (*Melilotus sp.*), and Spanish clover (*Lotus purshianus*). None of these species is ranked as FAC, FACW, or OBL; therefore, these depressions do not meet the criterion for hydrophytic vegetation. Garland daisy (*Chrysanthemum coronarium*) is overwhelmingly dominant along the swale near the northeastern boundary. This species also is not ranked as FAC, FACW, or OBL; therefore, the swale does not meet the criterion for hydrophytic vegetation.

5.5.5.5 WILDLIFE

A total of 2 reptiles, 1 amphibian, 37 avian, and 6 mammalian species were documented on the site. A complete listing of those species documented is attached (Table 5-7).

5.5.6 Sensitive Resources

5.5.6.1 FLORA

Based on the field survey and on the habitats of listed threatened and endangered plants known from the region, it can be concluded that no listed plant species occur on project site itself (see Table 5-8).

5.5.6.2 HABITAT

CSS is considered a sensitive habitat by several resource agencies because it supports a number of State and federally listed endangered, threatened, and rare vascular plants as well as several bird and reptile species that are federally listed or are candidate species for federal listing. Of particular importance is the coastal California gnatcatcher (*Polioptila californica californica*). These species are in decline is because of the loss of their habitat. Loss estimates for sage scrub habitat in California range from 36 to 85 percent, but since these estimates were made in 1979 to 1981, additional losses have occurred (O'Leary 1990). Most of this habitat is located off site. Only a small amount of the CSS, in the form of Mixed Sage Scrub Grassland (0.18 acre), is within the limits of AA 3 and none appears to be within the estimated extent of debris placement area (Figure 5-13). As long as this area can be avoided, it should not be a jurisdictional issue.

Wetland resources are also considered sensitive because of their scarcity in semi-arid southern California, their value to wildlife, and recent loss of this habitat from urbanization, agriculture, and flood control projects. The Mulefat Scrub and disturbed wetlands are considered sensitive wetland habitats. Mulefat Scrub is only considered sensitive where it occurs in a wetland landscape position (i.e., along drainages and not on level pads). There is a very limited area of this habitat onsite, which limits its significance. If this area can be avoided, it should not be a jurisdictional issue.

5.5.6.3 WETLANDS AND WATERS OF THE U.S.

One part of the site, the head cut drainage way at the southeastern boundary, potentially meets federal criteria as waters of the U.S. and California criteria as a jurisdictional streambed (Figure 5-13). The OHWM, indicated by sediment deposits and small banks cut by running water, are about 5 feet apart over a distance of about 70 feet, so that a total of 350 square feet (less than 0.01 acre) of potentially federally jurisdictional waters of the US. This site, and no other part of the anomaly area,

meets criteria as waters of the U.S. If involved in this federal action, the CDFG would probably claim jurisdiction over all mapped mulefat scrub associated with the head cut channel.

None of Anomaly Area 3 meets all three federal criteria as a wetland. The head cut drainage way meets the hydrology, but not the vegetation criterion. The soils criterion could not be evaluated due to the origin and texture of soils on the site. If involved in this federal action, the CDFG, at its discretion, may consider the head cut drainage way a wetland, based on indicators of the hydrology criterion alone.

5.5.6.4 WILDLIFE

Special status species include those listed by state and federal agencies (CDFG 1994; USFWS 1989, 1990, 1992, 1993a, and 1993b) as endangered, threatened, rare, or of special concern. They also include species listed by Everett (1979). No listed or sensitive species was observed on the study site. One listed and one sensitive bird species and a sensitive mammal were documented adjacent to the site. These are discussed under the following species accounts and locations are depicted in Figure 5-13. A female Cooper's hawk was noted flying over an adjacent area, but was not nesting on or near the study site. The likelihood of other listed or sensitive species being present is detailed in Table 5-9.

5.5.6.4.1 Coastal California gnatcatcher (*Poliophtila californica californica*)

Listing: Federally Threatened and California state Species of Special Concern. On February 7, 2000, the USFWS proposed critical habitat for the gnatcatcher (65 FR 5946). A final rule was published Oct. 24, 2000 (Fed. Reg. Vol. 65, No. 206).

Distribution: Historically, gnatcatchers could be found from southern Ventura County southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties, and into Baja California, Mexico, to approximately 30 degrees North latitude near El Rosario (Atwood 1990). They were considered locally common in the mid-1940s, but this subspecies had declined substantially in the U.S. by the 1960s (Atwood 1980). Although observed declines in numbers and distribution of the gnatcatcher resulted from numerous factors, habitat destruction, fragmentation, and adverse modification are the principal reasons for listing of the gnatcatcher as a federally threatened species in 1993 (58 FR-16742).

Habitat: The gnatcatcher occurs in several distinctive sub-associations of the CSS plant community. CSS is composed of relatively low-growing, dry-season deciduous and succulent plants. Characteristic plants of the community include California sagebrush (*Artemisia californica*), various species of sage (*Salvia spp.*), California buckwheat (*Eriogonum fasciculatum*), lemonadeberry (*Rhus integrifolia*), California encelia (*Encelia californica*), and *Opuntia spp.* (Atwood 1990). CSS is patchily distributed throughout the range of the gnatcatcher, and the gnatcatcher is not uniformly distributed within the structurally and floristically variable CSS. Rather, the subspecies tends to occur most frequently within California sagebrush-dominated stands of CSS on mesas and lower slopes of the coast ranges (Atwood 1990). Comparative data on population densities between vegetation sub-association types within sage scrub are lacking. However, within the Riversidean association of CSS, data indicate that gnatcatcher fitness is positively correlated with relatively mature vegetation structure (Braden 1997). Any and all shrub species within the CSS are usable habitat for gnatcatchers. Furthermore, density of vegetation does not predict suitability of habitat (Braden 1997), but influences the territory size of the bird (Atwood 1992). Territory size increases as vegetation density decreases, probably due to food resource availability. Therefore, gnatcatchers will use sparsely vegetated CSS for shelter and forage for insects as long as perennial shrubs are available.

Status onsite: Three gnatcatchers were documented in the Southern Cactus Scrub, immediately to the northwest of the site during the BSR (Figure 5-13). They consisted of one adult (sex unknown) and two separate individuals of unknown age and sex. All birds were observed in CSS and were, likely, members of the same family group. The breeding season of the gnatcatcher extends from 15 February through 30 August, with the peak of nesting activity occurring from mid-March through mid-May. Although it is too early in the season to determine breeding status and specific location, it is likely that at least one pair will breed in this habitat adjacent to the study site.

5.5.6.4.2 Cactus wren (*Campylorhynchus brunneicapillus*)

Status: California State Species of Special Concern

Distribution: Southern Orange County (San Juan Creek) south through San Diego County into northwestern Baja California, Mexico.

Habitat(s): Restricted to clumps of prickly-pear (*Opuntia littoralis* and *O. oricola*) or cholla (*O. prolifera*) growing in CSS or along washes.

Status onsite: Two individuals, probably representing a pair, were documented in the Southern Cactus Scrub, immediately to the northwest of the site during the BSR. In addition, a cactus wren nest was found in that same habitat (Figure 5-13). Although it is too early in the season to determine breeding status and specific location, it is likely that this pair will breed in this habitat adjacent to the study site.

5.5.6.4.3 San Diego desert woodrat (*Neotoma lepida intermedia*)

Status: Federally Sensitive/California state Species of Special Concern

Distribution: Coastal slope of southern California from San Luis Obispo County south into coastal northwestern Baja California, Mexico.

Habitat(s): Open Chaparral and CSS, often building large, stick nests in rock outcrops or around clumps of cactus, yucca, or other woody vegetation.

Status onsite: One large stick nest was noted on the ground, among cactus scrub, on the property directly northwest of the study site.

5.5.7 Summary

1. No listed or otherwise sensitive plant species were documented on the site.
2. Three federally listed plant species, which have the potential for being onsite, were not found and/or the site did not have appropriate habitat. One listed species is presumed to be extinct locally.
3. Seven other plant species, of lesser sensitivity, which have the potential to be found onsite, were determined to be absent, based on the survey and the lack of suitable habitat (See Table 5-8).
4. No listed wildlife species were found on the site.
5. One listed animal species, the coastal California gnatcatcher, and two sensitive species, the cactus wren and the San Diego wood rat, were documented next to the site.

6. The potential for three other listed wildlife species (Quino Checkerspot Butterfly, San Diego Fairy Shrimp, and Riverside Fairy Shrimp) is low to non-existent because of lack of appropriate habitat on or next to the site.
7. The potential for animal species, of lesser sensitivity, which have the potential to be found onsite, is as follows: low potential for 26 species due to lack of suitable habitat, rarity, and/or food; medium potential for 3 species in suitable habitat or at a different time of year; and high for 5 species that were not noted at the time of the survey (See Table 5-9).